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ORIGINAL ARTICLES.

THE ORIGIN OF GLAUCOMA AND A SUGGESTION AS TO ITS EARLY MANAGEMENT.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY LOUIS F. LOVE, M.D.

OPHTHALMIC SURGEON TO ST. MARY'S HOSPITAL, ETC.
PHILADELPHIA, PA.

I do not desire to present any novel ideas with regard to the origin of glaucoma, or to recommend any special treatment of its earlier manifestations. My object is rather to direct attention to what I believe to be the principal cause of glaucoma simplex and acute inflammatory glaucoma, and to suggest the use of well-known remedies for a condition which may prove the starting point of the disease. The nature of this obscure trouble has always been a subject for speculation, from the earliest days of medicine, but it is only comparatively recently that its pathological character was understood. The work of the anatomist, the physiologist, the pathologist and the clinician have shed much light upon what was obscure to the older physicians. Until the time of von Graefe the character of glaucoma was very obscure, his discovery of its general character was a very great step forward, but left unexplained how or why the increase in intra-ocular pressure was caused. The circulation in the eye, and the nature of the ciliary body were then not understood, but von Graefe was shrewd enough to refer the cause of the pressure to a disturbance of the circulation. When the anatomist and physiologist had made clear the wonderful method by which the nutrition of the structures of the globe is maintained and had proved the existence of a current from the ciliary body through Schlemm's canal and into the triangular space, it was seen how obstructions of these small channels might readily cause such a disturbance in secretion and excretion as might cause an increase of intra-ocular pressure and thus the symptoms of glaucoma and, if maintained, the disease itself. (Knies and Weber.)

Any cause which produces a rise in the intra-ocular pressure will give rise to some, at least, of the common symptoms of glaucoma. They may be produced temporarily in the normal eye by a simple practice that I have often adopted. If the head of a subject possessing normal eyes is held in a dependent position and at the same time pressure is made on the eyeball for a short time, the subjective symptoms produced will be similar to those of disease. The globe becomes tense to the trained touch, chromatic rings surround a bright point of light and these symptoms accompanied by severe pain, if the experiment is carried far enough, and occasionally ciliary neuralgias are produced. These symptoms are evidently due to a disturbed circulation, and the study of the pathological conditions existing in glaucoma has confirmed the reasoning of the anatomist and physiologist. The cupped disc shows the effect of the intra-ocular pressure and where inflammatory processes have been set up their effects are found in the ciliary region. The cause of the increased intra-ocular pressure has therefore been justly assumed to be a disturbance in the fluid circulation of the eye. But what should cause a disturbance in a body so remote from external influence as the ciliary body? To this question no entirely satisfactory answer has yet been made, and I would therefore suggest that a further inquiry be made to determine the more remote causes of these changes in the circulation. It is very well known that the blood circulation is under the control of the sympathetic nervous system, and these nerves are well supplied to the various tissues of the eye; undoubtedly many, if not most of these are efferent, but undoubtedly also many are afferent, and control the circulation in the arteries of the eye. Remembering how frequently the blood vessels are acted upon by purely nervous influences of varied character, and how quickly purely normal and transitory changes may be rendered pathological, I could not but imagine that some, if not many, cases of glaucoma were caused by the result, either of repeated sympathetic shocks to the muscles controlling the blood vessel system of the eye with resultant venous stasis, or even as the result of a single severe shock which acted as a paralyzant to the sympathetic system of nerves. The idea is not new, as Donders long ago referred to this, but I believe that its therapeutic importance has not been enforced. Von Graefe thoroughly recognized the importance of a variation of the vascular pressure as causative of glaucoma whether inflammatory or not. He considered the origin of these variations to be intra-ocular, but with our present knowledge of reflex action this restriction is unnecessary.

That the pressure of fluid regulates the outflow so that when the afflux is increased a compensatory increase of the efflux occurs. (Snellen.) Can this hold good in an eye subjected to so frequent variations of pressure as occur in glaucoma? In regard to the effect of nervous shock as causative of glaucoma, I may quote Laqueur, who states that the symptoms of glaucoma often appear after sudden attacks of fright or anger, after sleeplessness, violent and exhausting labor, etc. Several cases which have occurred lately in my own practice have brought the same facts frequently before me.

Case 1.—Mary F., aged 41; four living children; two dead; no miscarriages. Says: "Enjoyed good health until ten years ago since which time has been exceedingly nervous, following an attack of typhoid fever. (Case referred by Dr. John H. Locke.) Sight good until the sudden death of husband, at which time she fainted; on recovery from the faint found herself blind in the right eye, with partial loss of vision in the left. Ten days later acute inflammatory glaucoma in both eyes. Marked hysteria and melan-

cholia. The case progressed in the usual manner. Iridectomy on both eyes.

Case 2.—Mrs. K., aged 55; eight children; three living; no miscarriages. Says always enjoyed comparatively fair health. Dates the gradual loss of vision from the time of an unfortunate accident, causing the loss of several lives for which her son was in a measure responsible. Left eye absolute glaucoma, right eye glaucoma simplex. Iridectomy on right eye.

Case 3.—K. H., aged 39; married; no children; no miscarriages. Dating from sudden death of father and subsequent family trouble her sight has been more or less bad; large, deep glaucomatous cup in right eye; shallow excavation with tapering of veins in the left eye. Arterial pulsation; increased tension; patient refused operation.

Case 4.—F. O., aged 55 years; cigar maker; patient profoundly neurasthenic and hysterical; similar history as to family troubles and great mental strain. Case of glaucomous simplex.

In all of the above cases they were referred to their accustomed medical attendant; no organic trouble was reported with the exception of the second case, where albumen and casts were found in the urine.

I do not wish to be understood as insisting that every case of glaucoma simplex, or acute inflammatory glaucoma has necessarily a nervous origin, or that the disease is *always* caused by reflex action through the sympathetic nerves. I believe, however, that a majority of cases can be traced to a nervous starting point, and it is to the cases thus caused that I wish to direct your attention.

The prodromes of glaucoma are exceedingly obscure; occasionally they seem to be wanting altogether, but cases not rarely occur in which, while there is no definite indication of glaucoma nervous symptoms manifest themselves which indicate the possible development of the disease. Such cases if looked for will develop in every ophthalmologist's practice and while it is of all the difficult problems of medicine, most difficult to prove "what might have been," observation has convinced me that glaucoma can be warded off, so to speak, by the use of the best means known to the neurologist for strengthening the nervous tone. In this event the case passes from the care of the ophthalmologist to the expert in nervous diseases, but I have seen in my own practice most beneficial results from the use of strychnia in moderately heavy doses, and in one case especially a long sea voyage has resulted apparently at least, in the prevention of the threatened disease. I do not think that the ophthalmologist should be called upon to treat such cases but they should be given the best advice as to hygiene and medicine that the present status of medical progress affords. As to the effect of electricity either local or general in such cases, I am not in a position to speak, but I believe that it might be highly beneficial.

Of course after the disease has developed there is nothing but the old routine to employ. Early iridectomy and the use of eserine comprehend the sum total of the treatment. It is in the earlier stages of the disease that the glaucoma offers the best prospect for useful therapeutic study, and it is to direct your attention to this study that I have engaged so much of your time.

I do not think our present knowledge of nervous irritation or sympathetic secretion is sufficient to enable us to make a very good defense of the theory that glaucoma is a nervous affection, but practically I think if we take careful histories of our glaucomatous cases that we will find nervous symptoms predominate.

1. Early symptoms, doubtful name of term.
2. Poor accommodation effort.
3. *Neurotic conditions*, neuralgia, etc.

POSTERIOR SCLEROTOMY AS AN IMMEDIATE PRELIMINARY TO SOME OPERATIONS FOR GLAUCOMA.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY H. GIFFORD, M.D.

OMAHA, NEB.

The proposition which I wish to maintain is that when the intra-ocular tension is high, a small incision through the sclera into the anterior part of the vitreous, made immediately before the various operations for glaucoma in which the anterior chamber is opened, greatly lessens the dangers which ordinarily attend such operations. These dangers are in brief: 1, that the iris may be wounded or the incision into the anterior chamber be improperly made on account of the shallowness of the chamber; 2, rupture of the suspensory ligament with loss of vitreous or sublaxation of the lens; 3, tardy healing of the wound; 4, failure of the anterior chamber to refill; 5, failure of the operation to immediately relieve the high tension; 6, rupture of retinal or choroidal vessels.

That a small incision into the vitreous, made two or three minutes before a glaucoma iridectomy, for instance, must greatly lessen these dangers is, I think, obvious from a moment's consideration of the conditions. With rare exceptions, glaucomatous eyes are hard because there is too much fluid in the vitreous; a scleral incision about one-eighth inch long, allows this excess of fluid to drain off without permitting the escape of any appreciable amount of the vitreous jelly. The contents of the vitreous chamber being thus lessened, its tension becomes, for an instant, less than that of the anterior chamber, and the latter immediately tends to become deeper, thus facilitating any incision into it, beside tending to break up any adhesions which may have formed at its filtration angle. With a low pressure in the vitreous, the danger of a rupture of the zonula must of course be less than when the pressure from behind is high. It is equally plain that the preliminary sclerotomy favors a prompt closure of the wound and decreases the chance that at the evacuation of the aqueous the iris may be so firmly pressed against the cornea as to retard the refilling of the anterior chamber, or perhaps prevent it entirely, as in the cases of so-called malignant glaucoma. Whether the danger of rupture of the retinal or choroidal vessels be lessened by a preliminary sclerotomy may be questioned; since when it is done, the two incisions probably remove more fluid from the eye than a simple iridectomy would, it might be held that the danger of internal hemorrhage would be increased; but where the sclerotomy is made slowly and the vessels are allowed a few minutes to accommodate themselves to this first reduction of pressure, I think the chances are at least even, that the total danger to the vessels is not increased.

I make the scleral puncture, sub-conjunctivally, with a sharp von Graefe knife, at a point near the outer border of the inferior rectus one-fourth inch from the limbus, enlarging the cut to a length of

about one-eighth inch. Made in this way the additional risk involved is practically zero, and by injecting a drop or two of cocain solution under the conjunctiva, the scleral cut is rendered as painless as the corneal section.

Primary glaucoma is a rare disease in my region, so much so that in the last two years I have had but four cases in which the preliminary sclerotomy seemed to be called for, and I feel like apologizing for the small amount of clinical material which I have to illustrate my theoretical conclusions. In two of these cases it was made immediately before making an iridectomy, with an excellent result in each case. In the other two cases, an iridectomy had already been made and the scleral incision was used as a preliminary to extracting what remained of the lens. In one of these, the patient was Miss T., age 27, who came to me about Sept. 15, 1892, with the history of glaucoma of the left eye of several years' standing. Two years before, a broad iridectomy had been done elsewhere without permanently relieving the tension. The eye was sightless and painful at times, with tension + 2. A broad posterior sclerotomy was made with only temporary relief, and as the patient was much averse to enucleation, I extracted the cataractous shrunken lens. Before making the corneal incision, however, I made a posterior sclerotomy and had the satisfaction of extracting the lens with a sharp hook without the loss of a particle of vitreous from the corneal wound. The operation afforded relief for but a short time, however, and in the course of six weeks the eye was eviscerated. The case simply indicates the advantage of the preliminary scleral incision when the lens has to be extracted from a hard eye; for without it the extraction in this case would almost certainly have been followed by a gush of vitreous.

The fourth case illustrates the same principle, but as the history exhibits the unusual feature of glaucoma developing after a broad preliminary iridectomy for uncomplicated cataract, together with one of the so-called spontaneous cures of cataract, I give it in detail. A. F., age 56; German; came to me April 15, 1887, on account of blindness of the left eye. I found the eye to contain a nearly mature cataract, rather whiter than the average, with nothing else abnormal to be seen about the eye. Light sense and projection first rate. The other eye showed slight central opacities of lens, but was otherwise normal; V. = 20-50 +. A preliminary iridectomy was made on the left eye and contrary to my present custom it was made fully as broad and peripheral as the average glaucoma iridectomy. The healing was normal and the patient left the hospital in a few days. During the next five years the man was seen once or twice but showed no perceptible change in either eye. On Feb. 18, 1892, he returned, stating that the sight of the left eye still remained unchanged (he could count fingers) up to the end of December, 1891, when the eye began to pain him and the sight to get worse To my surprise I found the eye blind except for uncertain light perception at the outer side of field, no projection. T. + 1½, eye injected and painful. The cataract had undergone spontaneous resorption with the exception of the greenish-yellow nucleus, which was dislocated downward and bobbed about with the movements of the eye. A red reflex could be obtained from the fundus but no details could be made out. No history of a trauma could be elicited. Right eye as at first examination: V. = 20-40 — with + 1 D. Without having much faith in the theory, I proceeded on the supposition that the movements of the nucleus might keep up the glaucoma, and extracted it with a sharp hook after a preliminary posterior sclerotomy, without losing a particle of vitreous at the operation. After forty-eight hours a minute bit of vitreous was found between the lips of the corneal wound, but this soon disappeared and the healing was otherwise normal. Some weeks afterward the man had a slight attack of pain in the eye but with this exception the relief afforded by the operation has been permanent. The occurrence of primary glaucoma after a broad iridectomy is rare, if not unique. The coincidence of glaucoma with spontaneous resorption of the cataractous lens has recently been noted by Witvalsky; and in my case, as in his, the onset of the glaucoma probably preceded the beginning of the resorption of the lens.

The case which led me to make posterior sclerotomy as a preliminary to glaucoma operations was that of a boy, aged about 11, who for years, and probably from birth, had had tremulous irides. As the result of a blow on the left eye, the lens was dislocated into the anterior chamber, with the immediate development of glaucomatous symptoms, which had persisted for several days when I was called. I found the eye very hard and painful (V. about 0, but no record made of it,) with the transparent lens pressed against the cornea doubling up the iris at its periphery. As I knew from an examination made two years before, that the eye had a fluid vitreous and a ruptured zonula, I hesitated about extracting the lens with so high a tension. I therefore made a scleral puncture below, which at once relieved the tension and after some hours, the lens was found to be in its normal position with the eye perfectly quiet. The boy remained in the hospital for three days with no return of the glaucoma. He averred that the sight of the eye was as good as ever, (this had always been the better of his two poor eyes) but disappeared before any accurate tests were made.

It was not until recently that I learned that Weber (Arch. f. Ophthalmologie, xxiii, 1, 86) had proposed posterior selerotomy to relieve the partial dislocation of the lens which occurs in the cases where, after a glaucoma iridectomy, the anterior chamber fails to refill. The proposition is a good one so far as it goes, only I feel confident that if the sclerotomy were done before the iridectomy, such cases of malignant glaucoma would rarely, if ever, be met with.

In employing posterior sclerotomy as an immediate preliminary to glaucoma operations, I supposed, until recently, that I was doing something entirely new. All the handbooks at my disposal, including the large treatises of Graefe-Saemisch and De Wecker-Landolt, are silent on the subject; but on obtaining the valuable monograph of Priestly Smith on glaucoma, I found (p. 161) the following passage: "A scleral puncture is easy to make, nearly or quite painless and apparently safe, and it fulfills a definite purpose; namely, that of withdrawing fluid from the vitreous chamber so as to lessen for a time the pressure behind the lens. I have many times employed it, and I think with advantage, as an auxiliary to iridectomy in cases of special risk, making the puncture, in most instances, immediately before the iridectomy, in order to relieve the very high vitreous pressure before allowing the aqueous to escape; in

others immediately after the iridectomy, because there was very little escape of aqueous and the eye remained unduly hard. Further experiments may lead us to employ it methodically in conditions of this kind." I hope that my own slight contribution, if it does nothing more, will attract to this opinion of so good an authority, some of the attention which it deserves. I should add that when the preliminary sclerotomy is made, the corneal incision is best made with the narrow cataract knife.

COMMENTARIES ON DISEASES OF THE LACHRYMAL PASSAGES.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY H. GRADLE, M.D.
CHICAGO.

The objective sign of disease of the tear passages, viz: the overflow of tears, varies in degree in different patients. From the history and by the personal examination, it can be learned that while the eyes of some patients water continuously as long as they are awake, others notice the watering only when exposed to wind, smoke or dust, or on using their eyes under the condition of eye strain. In this class of patients the tears accumulate only while some stimulus excites the tear gland; but in the first mentioned class the activity of the tear gland is a continuous one. As far as we know, the secretion of the lachrymal gland is, however, not a continuous one under normal circumstances. Thus it has been noticed in congenital, absolute impermeability of the tear passage and after surgical obliteration of the tear sac, that the tears appear only when some external stimulus calls them forth. If hence an eye waters when no such external cause accounts for it, there must be some morbid irritation which maintains the continual activity of the glands. It can be proven therapeutically that in some instances the source of this reflex secretion is an intra-nasal anomaly, but in others the origin of the reflex appears to be the disease in the tear passage itself.

Observation has taught me that it is of some importance to distinguish between these two classes of lachrymal disease, viz: the cases with occasional and the cases with continuous lachrymation, although in some exceptional instances it may be difficult to decide to what class the patient belongs.

In those cases in which lachrymation is not continuous it is sometimes so slight that the patient does not speak of it. Hence if an operator is not on his guard he may overlook the presence of a purulent dacryocystitis in operations on the eyeball. In other instances, relief may be sought for some secondary condition caused by the lachrymal disease, without the existence of the latter being known to the patient. I have seen two instances of chronic purulent conjunctivitis in which the patients did not at all mention watering of the eye, but where pressure showed pus in the tear sac. In both patients the conjunctivitis, hitherto rebellious to treatment yielded readily on attending to the lachrymal disease. I have also seen some instances of blepharitis and asthenopic complaints in which the prime cause, viz: an obstruction of the tear duct could be proven objectively, but could not be inferred with certainty from the patient's statements, an observation previously spoken of by Becker (Af. O. xix 3, p. 353).

On the other hand, lachrymation by itself is not necessarily indicative of obstruction in the passages. Whenever the tears are secreted too fast, they can not be carried off by the healthy canal as is shown by physiclogical crying. Weeping hence occurs with normal passages in acute inflammation of the eye and sometimes also in consequence of eye strain. Nasal irritation, too, causes in some instances a flow of tears too copious for the capacity of the normal tear duct.

Since diseases of the tear passages are most frequently caused by nasal anomalies we find at times lachrymal obstruction associated with irritative lesions in the nose which determine a continuous flow of tears. The cure of the nasal anomalies may in such instances change the continuous to a periodic lachrymation, even though the lachrymal obstruction persists. In other instances, however, no intra nasal source of reflex lachrymation can be found, and the cause of the steady activity of the lachrymal gland must be sought in the disease of the tear passage itself.

According to my experience the prognosis of disease of the lachrymal passages is largely determined by the occasional or the continuous character of the lachrymation. When the eye waters only on exposure to wind and dust or on severe exertion the disease is, as a rule, easily removed, while in those patients whose eyes water continuously therapeutic results have either been difficult to obtain, or were entirely unsatisfactory in my experience. It has seemed to me that the choice of the therapeutic method may determine the rapidity of the cure, but that the completeness and permanency of the results depend on the nature of the disease rather than on the mode of treatment. It may of course be suggested that these statements are self-evident; that mild cases are more easily cured than pronounced disease. But this would only be a play of words. For in some of the instances in which the watering is not continuous I have found a most decided obstruction or firm closure of the passage, while again in some cases of very rebellious dacryocystitis with unremitting flow of tears, the patency of the sac is scarcely interfered with or easily maintained. Moreover in considering a case cured or not cured, I do not depend alone on the symptomatic indication of the epiphora, but judge by the patency to the probe in cases of stricture or the presence of pus in dacryocystitis.

In the discussion of therapeutic methods and results it seems to me important to insist more on the distinction between stricture of the passages on the one hand, and dacryocystitis on the other, than is commonly done in literature. The two disorders are of a different pathological character and require different plans of treatment. It is common, however, to read of the same treatment used without discrimination in both affections. But what I have said of the influence of the lachrymation on the prognosis applies equally to both forms.

In obstructive disease of the passages I have largely employed the electrolytic treatment described by Jesop and Stevenson. The lachrymal probe is made the cathode of a current of four to six milliamperes lasting one to three minutes, shocks being avoided by creeping into and out of the circuit. A convenient way of doing this is to vary the pressure of the sponge or leather-covered positive electrode upon the well

wetted skin of the face. Where possible without much resistance I have entered the intact punctum dilated by a conical probe with a Bowman No. 1 or even a fine platinum wire. Where the punctum was narrow I have, however, nicked it. After the current has passed a sufficient time but never more than three minutes, the probe which may have been grasped tightly by the walls while entering is felt to fit loosely. It is hence possible to introduce a probe more easily while the curcuit is closed than while it is open, provided there is no absolute closure of the passage.

As the ultimate result of electrolysis I can present the following data: while it is not frequent that permanent benefit is obtained from a single sitting, three to five electrolytic dilatations will restore the patency in most instances of lachrymal obstruction in which lachrymation is not continuous, It is thus a quicker mode of relief than ordinary probing. Its greater efficacy I have likewise observed in comparative trials on the two eyes of the same patient, and in some of the more tedious cases by using the same probe at alternate times with and without the current. But when no probe can be made to enter without undue force, it is less painful to the patient and as far as I can tell more useful in the long run to make at once a thorough Stilling's incision. If after this the patency does not persist I have sometimes found it advantageous to use probe No. 6 with electrolysis. But there are instances with much continuous weeping in which it is not possible to keep the passage open by any therapeutic means. The prognosis, however, is better if the continuous lachrymation is of nasal origin. If in such cases the causative nasal anomaly can be removed, the weeping changes into the intermittent type and the tendency to reëstablishment of the stricture ceases.

In purulent dacryocystitis the results obtained by a free internal incision depend on the condition of the sac membrane. My experience leads me to think that this is indicated by the degree of lachrymation. In any instance in which the eye was ordinarily dry except when irritated by the usual stimuli of lachrymal action, the purulent secretion diminished progressively from the time of the operation. It is in this class of cases that Stilling's assertion so ably defended by Thomas last year, applies literally, viz: that a single incision is sufficient for a cure without subsequent probing. The result has been the same, both where the knife met with considerable resistance and where the operation showed no real stricture. But I have learned to lay stress on the regular evacuation of the sac by pressure. In fact in very young children dacryocystitis will often heal by this procedure alone, without any incision whatsoever. When the lachrymation due to an inflamed tear sac is a continuous process the incision is not so likely to lead to a permanent cure. In some instances in which the caliber could not be maintained by the incision alone, electrolytic dilatation with large probes has been of service. But there are cases, presumably those with polypoid degeneration of the sac wall in which the passage stays clear, but the purulent secretion and overflow of tears do not cease entirely. Some of these I have been able to benefit by nitrate of silver injection (2 to 4 per cent.) and others by nasal treatment. But still there remains a minority of patients in whom the continual weeping and purulent secretion can only be cured by obliteration or extirpation of the sac.

THE TREATMENT OF NASAL DUCT OBSTRUCTION.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY CASEY A. WOOD, CM., M.D.

PROFESSOR OF OPHTHALMOLOGY IN THE POST-GRADUATE MEDICAL SCHOOL, CHICAGO; OCULIST AND AURIST TO COOK COUNTY HOSPITAL; OCULIST TO THE EMERGENCY HOSPITAL AND ALEXIAN BROS. HOSPITAL.

I find that some writers treat the whole subject of nasal duct obstruction in a sort of light and airy fashion, as if they were dealing with tarsal cysts or the removal of a foreign body from the conjunctival sac. Others run along in a most gloomy vein, entirely discouraging to the seeker after surgical consolation in the hour of doubt.

These facts have impelled me to bring before you some conclusions I have arrived at, regarding the treatment of this condition, both to introduce the subject and in the hope of hearing your criticisms.

First of all, how shall we distinguish between true organic stricture of the duct, and obstructions due to swelling of the mucous membrane? I have come to regard the answer to that question as a necessary preliminary to treatment and I have mostly applied this test: when the sac is enlarged and pus can be squeezed out of one of the puncta, an organic obstruction (at least stricture of the soft parts) is present, and I have rarely seen a case where even the most extended and carefully pursued treatment by syringing, irrigation or other procedure, preserving the integrity of the punctum and canaliculus, do more than palliate the discomforts of the case. On the other hand, if there be little or no cystic swelling and the secretion be entirely mucous and not overabundant, the obstruction is a swollen or otherwise diseased mucous membrane and is, in a fair majority of cases, amenable to the milder kinds of treatment.

Assuming that one must ferret out the first cause of the trouble in those cases where one has to deal with obstruction not of the organic kind, I feel certain that nasal diseases are the most important, an argument by the way, in favor of the oculist knowing something about the diagnosis of nasal troubles. Further than that, there appears some reason for thinking that the mucous membrane lining the nasal canal is liable to atrophic obstruction (from inspissated mucus and muco-pus) in atrophic rhinitis, quite as much as from the swelling that goes along with the hypertrophic form. Not enough is said about these matters. The entrance of the duct into the lower nasal meatus bears, I think, much the same relation to duct and sac and eye, that the neighborhood of the Eustachian entrance in the posterior nares holds to the tube, tympanum and internal ear. We should know as much about it in treating nasal duct obstruction—especially in those conditions not the result of organic disease—as we try to discover of the Eustachian entrance in middle ear disease.

It is often possible, particularly in the atrophic forms of nasal disease and in some other cases where cocain can be used, to see, if not the opening itself, at least the vicinity of that opening. For this purpose I would suggest, when simple anterior rhinoscopy fails, a very small post-nasal mirror.

Dr. Emile Berger in his very instructive monograph (*Les maladies des yeux dans leurs Rapport avec la pathologie générale p. 165*) pictures a mirror of this

kind 4 mm. in diameter but I think the larger sizes can often be used with better results. If the neighborhood of the opening require special treatment, it should receive it quite apart from that administered to the nose as a whole.

Having first proven by means of a small Bowman's probe—without the use of cocain which is likely to lead one astray—the patency of the canaliculus as far as the sac, *the amount of obstruction* within the duct (I do not mean its mere permeability) may be judged by the ease or difficulty with which one can inject watery fluid into the nose. In my experience this procedure furnishes us with a fair indication as to whether in a given case the treatment is—other things being equal—likely to be prolonged or not.

Coming to local treatment of the duct proper, I can not understand how, whether in cases of true stricture or not, the passage of the smaller probes, say Bowman No. 1 or 2, through the intact punctum and along the intact canaliculus, into the nasal duct can possibly do any good. I have often seen it do harm. If introduced under cocain in sufficient strength to anesthetize the sensitive mucous membrane, abrasion of some part of the passage is sooner or later pretty certain to be produced. Because it is not an easy maneuver, that of passing a probe of this kind so that its small, sharp end will strike the superior opening of the duct without injuring the membrane that covers it. But if one does manage it upon every occasion—*cui bono?* It is not large enough in the first place, to exert a healthy action upon any form of obstruction I know of and does not, when once in, give us any information not more easily and more safely obtained by other means.

Most cases of nasal duct obstruction—aside from stricture—can be cured by the local application of appropriate remedies, and it seems to me rational that the *sort* of local remedy is of importance. Most observers speak in a vague way about the nature of these, but why should we not treat the swollen or otherwise diseased mucous lining *here* according to the local condition, so far as we know it, or are capable of guessing at it? Anel's or Meyer's syringe, and those patterned after them, as usually sold, have too large a point. It is usually necessary in using them to first introduce the punctum dilator. Again, the barrel is usually too small, requiring repeated removal and introduction of the point when much fluid is needed. To remedy these defects I would suggest that a fine hypodermic needle, whose end has been cut off and rounded by a careful workman, should be attached to a good large barrel. It is then less distressing to the patient and makes on the whole a more useful instrument. With it one may flush the whole tract painlessly, easily and effectually.

Far better than any of these, when the duct is moderately patent, is the lachrymal irrigator which anybody can have made at a small cost. It is nothing but a reservoir, best placed ten feet above the patient's head, a piece of rubber tubing, a stopcock and the altered hypodermic needle aforesaid. All the operator has to do is to introduce it (and it is much easier of introduction than the point of a lachrymal syringe) and irrigate as much as he pleases.

Whatever I have done in these cases I rarely find that my patients present themselves often enough for treatment. One must have some kind of supplementary home procedure, and I know of none more simple and effective than that which Gould speaks of in a paper published last year in the *New York Medical Journal*. After a somewhat similar fashion I have been instructing my patients to help cure themselves for several years past. They soon learn to keep the sac emptied—by pressing upon it and forcing its contents into the nose—and afterwards allowing it to refill with the curative fluid applied at the inner canthus.

When stricture of the soft parts is present there is nothing for it but the knife and the use of the larger probes. But with a proviso—it seems to me to be a very weak and ineffectual kind of surgical procedure, that of doing the one without some guarantee that the other will be persevered in for several months afterwards, if need be.

Not many ophthalmic surgeons appear to entertain anything like that high respect for the intermediate lachrymal apparatus which its important functions seem to demand. So far as I know, the slitting of a canaliculus is never followed by a restoration of punctum and small canal, so that the peculiar suction force, exerted mainly by Horner's muscle, is once more possible. The ineffectual slit canaliculi that roam this and other countries will surely rise up in judgment upon us. At any rate they serve to discourage the neighbors of their possessors from being operated upon in cases where an operation is loudly called for.

How to introduce the probe and keep open the passage after the stricturotome has done its work—that is the rub. I teach my patient to introduce his or her own probe. It can easily be done within ten days after the use of the knife and is a real solution of the question. I feel sure that the majority of patients will not come week after week and month after month to have probes introduced. For one reason or another their attendance ceases, there is a relapse and one's reputation suffers in consequence. I have and have had all sorts of people, children, delicate nervous women, busy men and others keep up their probing in a way which I am certain I could never myself have done. Moreover the patient, in this way, shares directly the responsibility of the case. It is his or her diseased duct, and a failure to comply with the contract lays the blame at the proper door.

Finally, there is a class of cases in which in spite of long continued, patient, diligent and in my judgment, judicious treatment, there still remains a troublesome amount of epiphora. I do not know how to classify such cases nor am I very sure that I know why the lachrymation persists. It seems to me the lachrymal gland is made to act in some peculiar reflex manner, by the abnormal conditions existing in or along the lachrymal passages and, as we can not entirely remove the cause—can not restore these passages in some cases to the status *ante quo*, the incitement to lachrymation remains.

DR. GOULD—I am sorry I arrived too late to hear Dr. Gradle's paper in full, but I wish to say a word in regard to the plan of treatment which I have found successful in these obstructions of the lachrymal duct. The patient being in a recumbent position, I flood the eye with a simple astringent and antiseptic solution. Then emptying the sac by pressure, I again allow the solution to pass into the sac and duct, again pressing it out, and so on for several minutes twice or three times a day. I have been carrying on this plan of

treatment during the last year and have found only two cases where it was not successful. It has certainly been satisfactory so far as my own practice is concerned, and I have received word from two or three others who have found it equally successful. I find it often impossible to tell at a glance just what sort of stricture we have, and this at least is a ready means of differential diagnosis. I believe it will effect a cure in all cases where the stenosis is functional, due to congestion, etc., but not of course when there is organic stricture.

DR. BETTMAN—It seems to me that the division referred to by Dr. Gradle is a very wise one indeed. There are a great number of cases of epiphora where there is no stricture, but a hyper-secretion of tears due simply to reflex action from membranes of the nose. In these cases I have been content to wash out the lachrymal passages, and if I find water passes through easily into the nose I am sure the duct is opened. To the remark made by Dr. Wood in reference to the introduction of probes by Becker, I would say that Dr. Becker would not have been satisfied to use the 1 and 2 only, but he used 4, 5, 6 and 7. He passed them in rapid succession one after another, after having dilated the lachrymal duct with a No. 5 Bowman, tapering to a fine point.

THE CURVILINEAR REFLECTION OF WEISS AS A PRODROMAL SIGN OF MYOPIC DISTENSION.

Read in the Section on Ophthalmology at the Forty-fourth Annual Meeting of the American Medical Association.

BY B. ALEXANDER RANDALL, M. A., M. D.
PHILADELPHIA.

In a paper in the *Medical News* of Feb. 9, 1889, the writer called attention to a phenomenon first described by Weiss at the Baden-Baden meeting of German scientists and physicians ten years before, and asserted to be a prodromal sign of myopia. Another report on the subject was made by Weiss to the Heidelberg Society in 1885, and his elaborate paper was published in Volume XXXI of Graefe's Archives. The matter has since received little attention; and Dimmer's note in his Retinal Reflexes (Die Ophthalmoskopischen Lichtreflexe der Netzhaut), and my paper in English, (also in Kl. Monatsbl. May, 1889) are about the only further references to it. The careful study of Dimmer corrects the one minor point in which my view of the causation of the appearance seems in error, and gives full scientific corroboration of the facts; so the phenomenon may be regarded as real and noteworthy in a number of cases, and the questions of its frequency and prognostic significance come more distinctly and urgently forward.

Except to ophthalmologists of extreme "evolution" proclivities, the questions of the causation and progression of myopia constitute most important subjects of study, and concern closely all who practice eye surgery, whether they have many or few actual myopes to deal with. Myopia is a condition of refraction; and any statement that it is in itself a disease, meets at once a refutation and a recoil on the part of some to the view that it is a beneficent adaptation of the eye to its requirements. The excessive outcry about the "school-myopia" has done harm to the cause of school reform and impugned the honesty, as well as the judgment and observation of the reformers. The vast bulk of good, bad and indifferent studies and writings on the subject leave only a sense of bewildered disgust in the mind of any but the careful critic; for to the same investigator must sometimes be credited the worst as well as the best of the observations. The requisite critical analysis has not always been given to the divergent data and statements bearing upon the subject; and any and every view can obtain apparent confirmation among the host of contributions to the matter.

A general collection and analysis of the material available was made by the writer in the *American Journal of the Medical Sciences* of July, 1885, and extended in papers before the International Ophthalmological Congress of 1888, the American Ophthalmological Society in 1890 and the Ophthalmic Section of the AMERICAN MEDICAL ASSOCIATION in 1890, in the endeavor to sift the truth out of the numerous hampering or contradictory details which surround it. As a result of these studies it has seemed to me unquestionable that hypermetropia is the natural primary condition of the eye of the child and suffers little change with growth towards adult life through any normal increase of the dimensions of the globe. It does, on the other hand, constantly tend to diminish, as the result of pathological distension due to inflammatory softening of the tissues, as evidenced by changes in the eye-ground, most commonly about the optic nerve entrance. These changes have been variously explained, and their inflammatory nature combated by Stilling and others; but the minute observation of careful ophthalmologists demonstrates the reality of their inflammatory character. The study, therefore, of these conditions of conus, distortion and excavation of the papilla, the "drag" (Thomson, *American Journal of the Medical Sciences*, October, 1875) of the vessels and every other phenomenon which can give warning of the advancing process is abundantly worthy of attention. Among these phenomena this curvilinear reflex of Weiss certainly demands consideration; and it is a subject for regret that it has not received wider and closer study.

The appearance consists in a curved line of brilliant reflex, generally at the nasal side of the optic nerve and nearly concentric with its margin, shimmering and shifting like the other retinal reflexes, but marked by a certain constancy of form and position. Its conspicuousness is increased by the employment of an overcorrecting convex, or an undercorrecting concave glass, which has led Weiss to assign it to a position in the vitreous and to ascribe it to a collection of fluid interposed between this humor and the underlying eye-ground. Like all the retinal reflexes, it is best seen in this way; yet it can be traced to the retinal level and recognized as proceeding from its limiting layer. It is evidently due to the curve of the retinal surface, caused by the prominence of this margin of the nerve; and Dimmer has shown that it is an inverted image and must, therefore, proceed, not from the convexity of the prominence, but from the concavity where this passes downward into the general retinal level. Thus formed, the "reflex-bogenstreif" of Weiss indicates a real prominence at the corresponding margin of the nerve and not a hypothetical detachment of the vitreous. It is met most commonly in distending myopic eyes, although also seen in those which are hypermetropic; and my impression that Weiss is correct in regarding it as prognostic of increasing

distension has been strongly, if not precisely, confirmed by extended observation. While as yet unprepared, however, to fully substantiate this view of its significance, I desire to bring forward here some facts with regard to it and again to ask for it the careful study of ophthalmic colleagues.

The question of the frequency of the observation of this phenomenon must receive a slightly different answer since my more frequent employment of a strongly concave mirror in studying and seeking it; for like the other retinal reflexes, it is made much more conspicuous by this means. Examining in the autumn of 1891, 365 boys in a Philadelphia school, I noted it in but 40 eyes, and found it the next year in 124 eyes or 16 per cent. It was doubtless overlooked or unrecorded in some cases on each occasion, as the conditions of a hasty examination in which it constituted but a side issue were not favorable to an exhaustive search for it, but it was found in 11 per cent. of H and 26 per cent. of M: yet it seems certain that the eyes in that school will show no such percentage as the 38 per cent. of Weiss' average finding in a Manheim gymnasium, with 69 per cent. among the myopic.

As to its significance, no positive statement can yet be made. It has certainly been conspicuous in a group of cases of progressive distension of the eyeballs and consequent increase in refraction; and I have regarded it as so probably of unfavorable prognosis that I have employed redoubled precaution in all patients presenting it, in the effort to obviate or minimize such a change. Hence I could report a number of instances where there has not yet been any change in the refraction. On the other hand, one or two cases of progression have been met where it was absent—first and last. It may be hardly necessary to say again what I have previously stated in this section, that in my experience the tendency of myopia to progress is not the rule, as sometimes stated, but is the great exception. Hence my opportunities for observing these cases are not very large, and it seems better to try to enlist others in the study; for I think those who have sought this phenomenon have found it with rather increasing frequency and have reason to regard it as a warning that deserves consideration.

The primary claim of Weiss, that the curvilinear reflex is frequently quite difficult to see and is hardly, if at all, discoverable even in some cases where it is to be expected, has been abundantly corroborated. At the focus of the retinal level it is often inconspicuous in the most marked cases; and as the macular region generally shows a deeper level than the nasal border where it is formed, overlooking of its presence is most natural. The narrow pupil interferes somewhat with its ready investigation, but the flood of light admitted through a wide pupil tends to make less conspicuous all reflexes. The numerous shifting reflexes along the vessels, especially in young eyes, can confuse the picture, since the Weiss reflex, unless marked and typical, may seem but one of them. Indeed, until a striking case is encountered, even the ophthalmoscopist who has looked for the curvilinear reflex may remain skeptical as to its occurrence. Once well seen, it can hardly fail to interest the observer and raise questions as to how often he has failed to recognize it in the past.

Whatever the precise causes, efficient and secondary, of myopic distension, (and under this head I include all increases in the axial refraction), visible changes about the optic nerve entrance are the rule, and the posterior pole of the globe generally shows a measurable depression. Concomitant with this there is apt to be a prominence of the nasal margin of the nerve, giving rise to the curved surface from which the reflection proceeds. The view of Hasner, which Weiss advocates, that distortion is caused by the pull of a too short nerve, has certainly some show of probability and should lead us to seek carefully for evidence of this prominence of the nerve margin in all cases. The result of such a study will certainly be that many instances of it are noted, that changes in it will be observed in certain cases followed sufficiently long, and that an additional series of interesting and probably important studies will be contributed toward the advancement of our specialty.

The number of instances of this phenomenon which I have thus far observed, and the short periods of their study, do not permit of my drawing any sweeping conclusions. I can only say that I have seen more tendency to increase of refraction in these than in any other group of cases, and am forced to regard the presence of Weiss' reflex as calling for special precaution and guarded prognosis, with regular periodical examination of the vision and refraction.

A CASE OF PERSISTENT SPASM OF THE ACCOMMODATION, RELIEVED TEMPORARILY BY TENOTOMY OF THE EXTERNAL RECTI.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY ALBERT RUFUS BAKER, M.D.

CLEVELAND, OHIO.

Miss P., aged 39, at the age of 33 began to suffer from headache, pain in eyes when reading. In a few months was obliged to give up reading and using the eyes altogether. Was treated by various physicians for nervous prostration, neuralgia, etc. Finally advised to seek a change of climate. A residence of several years in the West proving of no benefit she returned East for treatment.

In May, 1892, she came under my care. Family history good and her own health had always been good until the present trouble. She is fairly well nourished, appetite good, bowels regular, sleeps well and no menstrual trouble or other difficulty. Says she would be well if she could get relief from constant headache and pain in eyes when using them. Headaches mostly occipital but much pain referred to temples and vertex.

Upon examination, I found vision right eye 20–20, not improved with + lenses or cylinders; left eye 20–70 improved to 20–50 with + 1 D C axis 75, and an insufficiency of the internal recti of about four degrees for distance. I ordered a pair of prisms 2 degrees each eye combined with cylinder for left eye, confidently expecting marked relief from headache. Was much disappointed in finding that they were of no service. I then resorted to the use of atropia and found a rather high degree of latent hypermetropia, and a slight astigmatism in right eye, vision under atropia uncorrected. Right eye 20–70 with + 1.25 D S.⊂25 C axis 90, increased to 20–20. Left eye 20–100 with + 1.75⊂ + 1.25 axis 75, increased to 20–50. I prescribed right eye + 1.⊂25 axis 90 ⊂ prisms base 2 in., and left eye + 1.25 S ⊂ + 1.25 C axis 75⊂ prism 2 base in. and congratulated myself that I had made a very important discovery under the atropia and that all the difficulties would be at an end, but I was doomed to disappointment, and my patient with the expensively ground lenses was only able to see 20–100 with right eye, and 20–200 with left, and notwithstanding a long, painful trial on the part of my patient the vision would not improve.

I will not weary you in detailing all the changes

I made in these lenses, discarding the prisms, reducing the strength of the spherical lenses, bandaging one eye, systematically exercising the muscles with prisms, the persistent use of atropia at one time for three months without at any time relaxing the persistent spasm of the ciliary muscle. Dubosin, homatropin and the whole list of constitutional remedies including iron, arsenic, strychnia, zinc, phosphorus, anodynes, anti-spasmodics, coal tar preparations, etc., were used without benefit. It is not often that an intelligent patient will endure all the local and constitutional treatment I heaped upon her and being no better at the end of a year's treatment be willing to continue.

Although I have been performing tenotomy graduated and otherwise during the past nine or ten years, I still remain skeptical as to its relieving a case like the one under consideration, but after consulting with my friend Dr. Millikin, I determined to give it a trial. So I made a tenotomy of the left external rectus on April 1, and was greatly delighted on the following day to note that the patient could read 20-20 with right eye with + 75⊃25 axis 90 and 20-50 with +1. D⊃+1. axis 75 with left eye; the first time there was any relaxing of the ciliary spasm since the case came under my care, excepting when under the influence of mydriatics. This continued for four or five days; patient was almost free from headaches. She was happy and so was I, and it was during this period of mutual congratulations that I sent the title of this paper to our secretary.

But our happy frame of mind was of short duration; the headaches gradually returned, the vision for distant objects became blurred with the spectacles. For a time she could see clearly in the mornings through the lenses, but later in the day everything became hazy and the old fashioned headache returned and at the end of two or three weeks was nearly as bad as ever. In the meantime a slight insufficiency of the internal recti of about two degrees again developed. A tenotomy of the right external rectus was made with no apparent benefit either to headache or vision. At present, the muscles are perfectly balanced for distance, a slight tendency to deviate outward for near vision. The headaches are as severe as ever. Mydriatics give slight relief from headaches as before the operation. It is altogether probable that in a few years with increasing presbyopia the patient will be relieved of her distressing symptoms of asthenopia, but I should not be surprised if she should suffer from some other reflex neuroses fully as painful.

I believe that nearly all the troubles we have with the muscles of the eyeball are due to, and are the direct outgrowth of the errors of refraction. This is generally recognized in cases of hypermetropia as a cause of strabismus. In most cases of muscular asthenopia we have the same excessive nervous stimuli sent to one pair of muscles that we do in strabismus, and those patients who have not sacrificed binocular vision, consequently suffer from pain and other nervous disturbances, due to the conflicting efforts at accommodation on the one hand; and those of convergence on the other. It has been my experience not infrequently in cases of errors of refractions, after correcting the ametropia to find that while I had relieved the pain due to the efforts at accommodation, I had disturbed the equilibrium that had become established between the efforts of accommodation and those necessary for perfect binocular vision, and thus set up a train of symptoms almost, if not quite as annoying as those from which the patient suffered before. And on the other hand, after performing a tenotomy of one or more of the recti muscles, I have relieved these patients of one kind of distressing symptoms, only to be followed by others fully as bad, so that I am skeptical as to the possibility of benefiting any case of asthenopia by a tenotomy in which prisms or the closing of one eye does not give temporary relief.

A pertinent question might be raised as to the frequency of persistent spasm of the accommodation. We oculists so frequently use atropia, prescribe spectacles, and if the patient returns complaining of a blurring of sight for distance tell him to continue the use of his glasses and the sight will clear up in time. Are we sure it does always clear up? Do not many of our patients discard our spectacles and return to their family physician or to the use of some popular headache cure to get relief? Or in these later days seek the advice of some of the specialists—oculists who make graduated tenotomies on every case in which there is a slight deviation of the eyes revealed by one of the many equilibrium tests. I think it was our genial ex-president Dr. Connor, who reported a patient upon whom thirty-two graduated tenotomies had been performed, without any marked relief of the asthenopia. I have seen several cases in which nearly as many have been done. I have a deviation outward revealed by this test of about four degrees in my own eyes, yet it causes me no inconvenience, and I should not allow any one to divide my external recti even partially.

These cases are all susceptible to mental impressions. They prove a fruitful field for quacks and charlatans in and out of the profession. They present the most brilliant cures effected by the faith healers and Christian scientists. The mental impressions of having had an operation performed will effect a temporary cure at least. Especially if the surgeon has enough of that peculiar attribute that inspires implicit confidence in the mind of his patient that the operation *will* cure.

A good illustration of this mania for operations is that presented by the "orificial" surgeons. Several of our Cleveland hospitals are filled with these patients so that it is difficult to find room for a patient needing a legitimate operation. It is the fashion now among certain classes of the community to have their rectum, their vagina, their urethra, and I am even informed in some cases, their umbilicus *stretched* by these "orificial" surgeons.

It has been my practice in these cases of asthenopia to first correct the error of refraction. If the asthenopia is not cured then resort to the use of prisms and the systematic exercise of the muscles. If the prisms, muscular exercise or the suppression of the image in one eye gives even partial relief I then propose a tenotomy, with considerable assurance that it will be of permanent benefit. But, in all cases in which no perceptible improvement can be obtained by the use of prisms, muscular exercise or closing one eye, I give a very guarded prognosis as to the result of a tenotomy, because in my experience the operative treatment of these cases has usually proved unsatisfactory. The disease, as I believe, frequently being the expression of a general neurosis and not amenable to ocular treatment.

SOME PRACTICAL EXPERIENCES WITH MUSCULAR ANOMALIES.

Read in the Section on Ophthalmology at the Forty-fourth Annual Meeting of the American Medical Association.

BY T. E. MURRELL, M.D.

LITTLE ROCK, ARK.

I consider the Maddox rod the most valuable and reliable test for heterophoria that we possess. Until I became acquainted with it I often had much trouble in arriving at any satisfactory conclusion as to the muscular tendencies. Since its introduction diagnosis is in most instances made easy.

The Graefe test is perplexing and unreliable in determining small errors in the lateral, and especially, in the vertical plane, the latter being extremely important even to so small an amount as half of a degree, which amount, and even less, the rod test will quickly recognize. The phorometer of Prince is a most convenient and ready application of the rod test, and is extremely satisfactory in detecting any error less than four degrees. While far more accurate than any methods heretofore possessed for measuring the muscular balance, the rod test is not absolutely reliable owing to certain physiological laws resident in the visual act as will be shown further on.

Since the very valuable contributions on the subject of heterophoria by Dr. Stevens, with his comprehensive nomenclature for designating them, a new era has been opened up in ophthalmic practice. Now that light has been thrown on this very important subject we can look back and recognize many cases in our experience that, for better knowledge we called retinal asthenopia, or some equally ambiguous title, and which after much vexation we relegated to the limbo of the incorrigible.

No eye that is subject to tiresome vision is completely examined until the muscles are carefully tested for any tendency to deviate from a perfect balance. This is now a rule with all accurate observers and we are astonished at the percentage of asthenopics who show some muscular anomaly. In how far heterophoria depends on refractive errors, just as we know heterotropia does, is not yet clearly made out; but it is more than probable that some refractive fault, with or without an existing amblyopia, is at the bottom of nearly every such condition.

I can hardly call to mind a heterophoric subject who was emmetropic, or had perfect vision in both eyes. In view of this fact, some very competent men only correct the error of refraction and claim thereby to restore any want of muscular balance. The most of us can not accept any such rule, although relief now and then comes under our personal observation, as in the following illustrative case:

Mrs. B., age 28, consulted me on account of inability to read or sew more than a few minutes consecutively without bringing on a severe headache and great distress. Her general health had been greatly impaired by a confinement with severe lacerations some five month previous. V=20-15 partly with either eye. Ophthalmoscopic examination was made especially to settle a point of dispute as to the existence of a central lesion. A normal fundus was found. Under paralysis of the accommodation: O. D. V=20-40. + .75 Dsph. ⊃ + .25 Dcyl. 90°=20-20. O. S. V=20-30. + .75 Dsph. ⊃ + .25 Dcyl. 90°=20-20. Rod test reveals an esophoria at twenty feet=10 degrees. Ordered for her the cylinders for reading or sewing. She wrote me a week later that the glasses gave her comfort. A month later I heard that she could use her eyes more than she had done for months. Not having the opportunity to see her and test her, I could not say positively the esophoria had disappeared, but certainly the asthenopia had; and this would lead one to infer also the esophoria. According to a rule given further on, this case, with an esophoria of 10 degrees, called for an operation.

If one will carefully test all his refraction cases with the phorometer, he will find a large percentage of them show lateral deviations of a few degrees which, within a certain limit, say two or three degrees, I regard as physiological. Repeated tests will show these deviations, however, to be variable. The association between convergence and accommodation is so intimate that in many cases of either astigmatism or hyperopia uncorrected, we find an esophoria of two or four, or even more, degrees that calls for no special attention further than correcting the refraction. By putting the accommodation in abeyance we may convert an esophoria, apparent or an orthophoria real, into an exophoria, as the following history will show:

Mrs. S., age 27, general health bad for a year, is very nervous at times and is subject to severe headaches. Her physician sent her to me to see if her headaches and nervous phenomena could be induced by some ocular anomaly. O. D. V=20-40. O. S. V=20-30. Ht=1.25 D each eye. Orthophoria. Ordered for her + .75 D. sph. for each eye for constant wear. They seemed to relieve her for awhile, but she returned after two months complaining that the glasses did not relieve her any longer, although she could see better with them. Rod test now shows exophoria=2 degrees at twenty feet and 8 degrees at twelve inches. With prisms 1 degree each bases in, combined with the spherical glasses, she has easy vision.

In the two cases just cited, we note the ill health and the nervous symptoms. Heterophorias in my experience are most frequently found in the neurotic and, like refractive and other troubles in this class of people, are more difficult to relieve. I have had under my observation at different times several members of one family, all of them of high nervous organizations, for refractive and muscular errors, in whom the most exact correction failed to give satisfactory results. Hence they have gone the rounds of specialists, consulting the most eminent, with like unsatisfactory results in every instance.

An eso-or exo-phoria of a few degrees does not call for correction, unless there is well-defined asthenopia after the correction of any refractive error that may exist. In these cases the addition of a prism or, when the result can be so attained, decentering the lenses will often give complete relief. Those anomalous cases of esophoria for distance and exophoria for near, or sometimes the reverse, often do not admit of easy solution.

Dr. Stevens claims that in those cases of unstable balance of the lateral muscles, being at one time an esophoria and at another an exophoria, there is invariably a hyperphoria present. This is a very wise and practical observation, and we should be careful in such conditions to carefully note the vertical balance. There are exceptions to this rule, as will be seen from the following case that came under my observation:

S. K., age 8 years, complains of his eyes at school. Says while reading the letters sometimes become mingled so that he can not distinguish one from another, but by looking off for a moment he again sees distinctly. O. D. V=20-70: O. S. V=20-50. Paralysis by hematropin and cocain: O. D. V=20-00; + .75 Dsph. ⊃ + .25 Dcyl. 90°=20-30. O. S. V. =20-00: + .75 Dsph. ⊃ + .25 Dcyl. 90°=20-30.

While watching him, I noticed one eye diverge fifteen or twenty degrees and instantly return to parallelism on my

calling his attention. On covering one eye while fixed on an object at 12 minutes it would diverge decidedly. His mother now informed me that his eyes had always been doing this and were much worse when he was younger. She said she had often noticed when he sat musing, that both eyes would seem to turn far apart, and that it used to be far more excessive and frequent than now. He had binocular vision for all distances. His convergence was about twelve meter angles, which he could hold for some time; in fact, he had a habit of looking excessively cross-eyed for amusement. On making the rod test I found no hyperphoria, but there was a variable lateral tendency. There would sometimes be orthophoria and then exo- or eso-phoria, the latter sometimes registering as high as eighteen or twenty degrees. These wonderful acrobatic performances with his eyes astonished me. The very strong tendency to deviate outward, as his mother had so often observed, and as was easily demonstrated by placing a screen over one eye, would look like warranting an operation on the external rectus, but his very great power of convergence was a danger signal to any operative procedures. So, desiring to watch the case longer, I determined for the present only to correct the small error of refraction. He chose the minus rather than the plus cylinders, and expressed much satisfaction at the comfort they gave him. A month later his parents went abroad and have not yet returned, but just before leaving I saw him and he said his glasses pleased him very much, and he had no complaints to make about his eyes. In this case you will observe there was no hyperphoria; but it will be seen that after the most perfect correction of the refraction possible, vision was still barely two-thirds of normal; in other words, there is amblyopia, a chief factor, as has been already pointed out, in these heterophoric cases.

We know that the vertical deviations are the most distressing, and can readily understand how they may so destroy the equilibrium of the eyes as to give rise to variable eso- or exo-phoria, but they are not the only factors in these conditions. In fact the hyperphoria seems sometimes to be an after product of the eso- or exo-phoria, and correcting the latter by an operation will very largely remedy the former. The following case is interesting because of two features: one, the persistence of troublesome diplopia in a case of long standing concomitant squint, and the other, the presence of a hyperphoria which gave no trouble after the correction of the squint.

Miss L., age 17 years; at 11 years of age began to have periodic squint, which became permanent at 14 years old She has been troubled with diplopia ever since the squint came on, varying with the squint when periodic and continuous since the squint has became permanent. When I first saw Miss L. I found the following conditions: strabismus convergens of about 35 degrees with homonymous diplopia. The squint is alternating but fixation is preferably with the left eye. When the right eye fixes she has diplopia, seeing the false image with the left eye some thirty-five degrees to the left side. She has no diplopia when the left eye fixes. V=O. D. 20-40: O. S. V=20-20.

Jan. 16. Made a free tenotomy on right internal rectus, giving binocular vision immediately after the operation, and there was no longer diplopia in any direction.

Jan. 20. Under atropin O. D. + 4. Dsph. V=20-25; O. S. + 2.50 Dsph. V=20-20. Rod test now shows esophoria =16 degrees and right hyperphoria = 6 degrees, although she expresses much relief since the operation. A prism of 6 degrees base down to right eye, correcting the hyperphoria, half corrects the esophoria. The following glasses were ordered for her: O. D. + 3. Dsph. ⊃ prism 3° base down; O. S. + 2. Dsph. ⊃ prism 3° base up. With these she had easy and comfortable vision for some months. April 25. She returns for further treatment as she is beginning to have diplopia again at times. There is now a convergent strabismus of about fifteen degrees. The hyperphoria is unchanged. April 28. Made a careful tenotomy of the left internal rectus, over correcting about four degrees. Put in a suture correcting the excess. May 2. Exophoria=8 degrees, although she has ten meter angles of convergence. Right hyperphoria = 5 degrees. May 13. At twelve inches there is esophoria of three or four degrees and at twenty feet exophoria of same amount. With the following glasses she has binocular vision at all distances: O. D. + 3. Dsph. ⊃ prism 3° base down: O. S. + 2. Dsph.

She returned home, wearing these glasses constantly, and a few months later she wrote me she was going to school and had no trouble with her eyes. In this case, after correcting the esotropia the hyperphoria was corrected by a prism and the relief was complete, notwithstanding an exophoria for a distance and an esophoria for near.

In adapting prisms for the correction of hetrophoria there can be no fixed rule, and in any given case it is very largely a matter of experiment. The rule given with Prince's phorometer is, to correct one-half of a hyperphoria and from one-fourth to one-half of an eso- or exo-phoria. I have found that we should correct almost, if not quite, the total hyperphoria where prisms are accepted at all, and a majority of the exophoria, while the proportion of an esophoria that will bear correction is usually one-half or less. To avoid the constant use of prisms, which are so often unsatisfactory, the weak muscle is sometimes developed by a system of gymnastic training brought about by so placing prisms before the eyes as to increase the error already existing, and for the time forcing the muscle to do more work than ordinary. While some surgeons claim satisfactory results from this system of treatment of insufficiencies, I must say I have found it tedious, laborious to the patient and in the end unsatisfactory in the majority of instances. Perhaps the fault may be in the method and not in the principle, which is certainly philosophical to say the least.

As commonly advised, prisms so adjusted as to put extra work on the weak muscles are to be worn a few minutes at a time, and the length of time increased daily. If we but think a moment of the manner in which we go about developing the other muscles of the body we will see how very unnatural this is. If, for instance, we want to develop the biceps we do not lift a weight, draw it near the shoulder and hold it there several minutes, and then lay it down until the next day, when we repeat the exercise in the same way, only holding it a little longer each day. No; we alternately flex and extend the arm holding the weight, so as to contract and relax the muscles at short intervals. This is the law that governs in all physical exercises where the development of a voluntary muscle is the end sought. Why should not this same principle apply to the voluntary muscles of the eyes? I am indebted to my friend, Dr. G. C. Savage of Nashville, Tenn., for the above suggestions. He applies the principle to training the weak eye-muscles in the following manner: having adapted the prism of the required strength to give appropriate exercise to the weak muscle, the eyes are fixed binocularly on an object, say the printed letters of a page, for a few seconds (Dr. Savage suggests ten); then the eyes are closed for a like period, when they are opened and again fixed on the printed page for a like period, thus alternately fixing and relaxing the eyes for several minutes at each time of exercise. We in this manner imitate the ordinary methods used in developing the voluntary muscles in other parts of the body. I have not had opportunity of testing this method, but it appeals to reason.

There are cases, however, that will not yield to prisms or to orthoptic training and we then have to resort to surgery. It is not always easy to draw the line between operable and non-operable cases but a very practical rule, already adopted by most of us,

doubtless, has been published by the editor in the *Ophthalmic Record* which is: whenever the red glass over one eye shows diplopia, or there is a hyperphoria of 3 degrees or an esophoria of 10 degrees we should operate. To essay an operation on a muscle to correct an insufficiency of only a few degrees, requires of the surgeon much confidence in his ability to cope with the subject in hand. The methods of operating differ somewhat with different surgeons, as do also their opinions and experiences as to the results from any given method or amount. Some prefer very limited and repeated division of the tendon. Others prefer to gauge the operation by the result desired beforehand, and to divide just so much tendon and no more and await the result; while still others, and this is my preference, carefully divide the tendon, stopping and testing frequently until the necessary amount of correction is obtained. This seems to me the only practical method, and I seriously question the claims of those who say they can produce the result of a certain amount of division of the tendon. Sometimes a total tenotomy will give no more result than a very limited division of the tendon will in other cases. We are all aware of this in the operation for strabismus where such varied results are obtained from a clean tenotomy. Another troublesome feature in these tenotomies is, that they do not always remain just where we leave them; what shows by the phorometer perfect correction on the completion of the operation will, in the course of some days or weeks, show either an over correction or an under correction.

When the tenotomy, partial or total, gives an insufficient result the opposing muscle may be advanced; but in the heterophorias we generally have little trouble in getting enough result by tenotomy with almost no risk of proptosis. Some cases of heterophoria are particularly obstinate to correction. Whether there be such a thing as antipathy to single vision as taught by von Graefe, or whether the hyperphoria, as Dr. Stevens declares, is always the cause of the difficult fusion, is a matter yet open to discussion. The following case, which came under my observation, fully tested all my ability, patience and perseverance as well as that of the unfortunate sufferer himself·

Mr. J. M., age 33, first consulted me June 27, 1892, for diplopia and great confusion of mind, inability to think connectedly and strange, heavy sensations about his head which he ascribes entirely to the condition of his eyes. He stated that in January preceding he went to St. Louis to consult a prominent specialist, and recognizing an esophoria he prescribed prisms for him. They gave him no relief. The surgeon then made an operation on the left internal rectus muscle. For awhile the operation gave relief, but after some days he had exophoria. The left external rectus was now submitted to an operation, and not correcting the exophoria, the right was operated. These are the statements of Mr. M., on which I have to rely for the history of the case up to this time, as the surgeon in question failed to answer my request for a copy of his record of the case.

The discomfort and confusion continued until I saw him five months later. At that time I found the following condition: on looking twenty-five or thirty degrees to the left, he had crossed diplopia. With a red glass over the right eye, looking at a candle twenty feet directly in front, he saw the red flame 6 degrees to the left and 2 degrees below the white flame. The rod test showed exophoria = 6 degrees and right hyperphoria = 2 degrees taken at twenty feet. There was no slanting of the lines to indicate involvement of the obliques. Correcting the hyperphoria with a prism did not modify the exophoria. On covering one eye while both were fixed on an object, near or far, the covered eye would diverge decidedly. O. D. V = 20-70; O. S. V = 20-20. Correction under suspension of accommodation: O. D. + .50 D sph. ⊃ + .50 D cyl. 135° V = 20-03; O. S. + 1. D sph. V = 20-30.

I made a careful tenotomy of the right external rectus, testing several times until the images were brought together.

June 28. Exophoria = 3 degrees and right hyperphoria = 1 degree or less. June 29. No change. Divided the tendon of the left external rectus, stopping and testing frequently, and got no result until the last fibers were divided when there occurred an over correction of 4 degrees. A suture was put in, drawing the muscle back sufficiently to leave an under correction of 1 degree. June 30. There is now less than one-half degree exophoria for twenty feet, practically parallelism. July 2. Lateral balance good for twenty feet, the vertical band of light running directly through the candle flame. There is a right hyperphoria = 1 degree. He expressed himself as greatly relieved; his head feeling clear, the mental confusion gone, and no diplopia. He went home instructed to wear glasses and return in two weeks for further examination. He wrote me occasionally and expressed himself in such glowing terms of the relief he had obtained that I, as well as he, thought it unnecessary for him to again visit me. In about two months his old troubles began to return and he was again annoyed with diplopia and mental confusion.

October 29. Examination of Mr. M. showed the following condition: at twenty feet esophoria = 4 degrees, right hyperphoria = 3 degrees; at twelve inches exophoria = 8 degrees. I now added a prism to his glasses to correct the hyperphoria, but it gave no perceptible relief. November 28. Right hyperphoria = 3 degrees; esophoria at twenty feet = 1 degree. Exophoria at twelve inches = 14 degrees. As he complained now chiefly of inability to converge comfortably to the reading point, I decided to reduce the exophoria at the risk of causing diplopia for distance. Having apprised him of this, and obtained his consent to the operation, I divided the tendon of the left external rectus, giving orthophoria at twelve inches and esophoria at twenty feet = 24 degrees. He now had more or less constant diplopia, when looking off from him, but had easy fusion at twelve inches. There was now manifested a right hyperphoria of 5 degrees, and so I made a partial tenotomy of the right superior rectus, bringing the images to the same level. The following morning the hyperphoria had returned and measured 3 degrees. I divided very carefully a small lateral strand of the tendon, getting complete correction. I sutured back the left external rectus, dividing the eso- and exo-phoria for a distance and near about equally, giving 12 degrees of each. With a prism of 12 degrees base out before one eye he had ready fusion at twenty feet December 28. Still fuses readily at twenty feet with 12 degrees prism, but the rod test shows a right hyperphoria = ½ degree. There was annoying homonymous diplopia for distance, and so I made a partial tenotomy of the left external rectus, bringing about easy and perfect fusion at twenty feet. December 30. The lateral balance is still preserved but there is a left hyperphoria of 2 degrees. Put a suture in the right superior rectus and drew it forward slightly. December 31. There is now the most perfect balance he has ever had, there being orthophoria for all distances. January 13. Writes that his diplopia and confusion are returning. February 16. Esophoria = 14 degrees at twenty feet, and left hyperphoria = 4½ degrees. Made a careful partial tenotomy of the left superior rectus, frequently testing until sufficient correction was obtained. The esophoria now measured only 7 degrees or a reduction of one-half. February 17. There is no diplopia and the rod test shows a left hyperphoria of less than ½ degree. March 18. Esophoria = 16 degrees at twenty feet, and right hyperphoria = 3 degrees, the eyes having traveled through a circle and come back to about where they were in the beginning. Prisms gave him no relief. He was now very little annoyed by diplopia and expressed himself as feeling much better than formerly. Nothing daunted I again operated, this time dividing the tendon of the right internal rectus, getting no result whatever until the entire tendon was divided and the hook swept widely. This overcame the esophoria and brought the eyes to a very nice balance, the hyperphoria almost entirely disappearing after the tenotomy.

May 14. Mr. M. has gotten along very well since the last operation, two months ago, but there is still some confusion of vision, especially for reading. He has diplopia when looking to the extreme right or left, due to loss of motility, but this gives him no trouble as it does not come in the way of ordinary vision. Examination with the phorometer now reveals a right hyperphoria = 1½ degrees, and an exophoria

at twelve inches = 12 degrees, but at twenty feet there is orthophoria in the horizontal plane. Correcting the hyperphoria with a prism does not influence the exophoria. With the following: O. D. prism 1½ degrees base down; prism 2 base in, O. S. prism 2 degrees base in, he has easy and comfortable vision for reading distance. As he is only now troubled with the want of converging power in addition to the vertical deviation, these glasses correcting these two faults give quite comfortable vision for reading. After all the numerous tenotomies on Mr. M. there is no proptosis and the motility of his eyes is not perceptibly diminished.

What the final result is going to be one can not say, judging from the record of the case as here given with all its mutations. This case also very aptly illustrates those strange nervous phenomena pointed out by Stevens and others, due to want of balance in the ocular muscles. In his worst condition he could not trust his memory, and was afraid to change money in business transactions lest he should make a mistake. He seriously considered having one eye destroyed as he had been led to believe, and had so reasoned with himself, that this would put an end to all his annoyance.

The case was pronounced hysterical by the gentleman whom he visited in St. Louis, but I am disposed to credit his ailment to the muscular anomalies, solely for the reason that whenever he made most complaint of mental confusion I always found the most troublesome heterophoria. I have selected the foregoing cases to illustrate certain anomalies to the rules, as we understand them, at this stage of advancement in this comparatively new field of surgery and which, I trust, will in some small way help on to the perfecting of our methods of dealing with these very important as well as very annoying conditions.

Dr. Savage—I always like to give a reason for the faith that is within me, but not being able to do so in so short a time as five minutes, I must refer you to the last issue of my journal, to the two papers, one on "Rhythmic Exercise, the Proper Method for Developing the Ocular Muscles," and the other on "The Relationship Between the Centers of Accommodation and Convergence." In one or the other of these papers you will find a reason for every statement that I shall make. In the first place we have two forms of esophoria; true esophoria, dependent on the natural structure of the muscle or its attachment, and pseudo-esophoria, dependent on the relationship between the centers of accommodation and convergence. Likewise we have two forms of exophoria, a true and a pseudo.

In reference to Dr. Baker's case, I will say that spasm (in the true sense) of accommodation is always associated with, and dependent on, exophoria, and therefore can be cured by correcting the exophoric condition. If the patient is myopic a part of his exophoria—in some cases the whole of it—may be relieved by prescribing a full correction of his myopia; but if the patient is hypermetropic a full correction, or even a partial correction of the focal error will make the patient worse by adding a pseudo-exophoria to his true exophoria. When the exophoria is as great as in Dr. Baker's case, a part of this condition must be relieved by operation. In operating on a case of this kind only the exophoria for distance should be corrected, leaving the remaining exophoria in the near to be corrected by rhythmic exercise. It is always better to divide the operative effect between the two corresponding muscles. It is my practice to operate on one muscle *one* time only; but I never divide a tendon completely in any form of heterophoria, always leaving a few fibers above and below to prevent the muscle retracting too far. Exophoria in emmetropic and in hypermetropic eyes grows worse with advancing years, while an esophoria in such eyes decreases as the patient grows old.

Dr. LeMond—I have had some experience in the anomalies of refraction, in connection with asthenopia and a want of muscular equilibrium and in trying to establish the same by tenotomies of ocular muscles. And I have come to the same conclusion as the old negro who undertook to eat the largest potato in the country, when he said: "The more he ate the larger the potato got." So it is with me in regard to muscular anomalies, combined with errors of refraction; the more we cut them and the more attention we pay to the muscles alone, the greater the subject gets on our hands.

I think the digestive symptom often plays a very important part in these affections. In other parts of the body we might ascertain what existed that was assisting, in a reflex way, in augmenting the ocular anomalies. I think the more attention we pay to the whole body, but at the same time not neglecting the eye in our investigation, the more successful we will be. I think a great many of these troubles are augmented, very largely, in people suffering from nervous depression and poor digestion in connection with bad hygienic surroundings and the want of proper kind and amount of food.

In females, my experience teaches me that these troubles are often associated with uterine troubles of various kinds, which are always ready to act in conjunction in pulling down the system, and so with these complicated ocular troubles, a vade mecum is formed. I have quit looking for emmetropic eyes, for I believe that on a close and careful examination that we would not find one eye in one hundred to be in a state of absolute muscular equilibrium.

If decided squint is absent, by no means tenotomize the muscles. Exercise them with prisms, in a gymnastic sense, say ten or twenty minutes once a day, but do not prescribe prisms for constant use. Correct the manifest hyperopia or myopia and the astigmatism, which, I think, you will find in nineteen cases out of twenty. If the patient is under thirty years of age I give them 75 per cent. of a full correction with glasses, and I think I can safely say that nineteen cases out of twenty, which have come into my hands, have been relieved.

Dr. J. L. Thompson—My experience is somewhat like that last given. We are indebted to Dr. Murrell for the interesting paper and classification. I believe there is a very large class of these patients who can be cured, or relieved almost entirely, by the correction of refraction. This will include 90 per cent. or more of the muscular conditions. A number of years ago when I first began practicing I corrected, as far as possible, the muscle errors by means of prisms and would get almost entire relief; and almost invariably on correcting the refractive error the astigmatism particularly would get entire relief. In correcting astigmatism alone, I believe relief often comes to the patient. There will be a small per cent. of these patients who will have to have the muscular anomalies corrected by operation, but the majority yield to correction of refractive errors. It is a bad thing to be picking at one muscle so many times. I have had patients who wore the prisms for some months and not a particle of insufficiency of the recti muscles existed after two years. I do not believe that a partial tenotomy ever benefited a case on this earth, but that all such reported cases would have done just as well without the operation.

Dr. Gradle—In the heat of discussion on the importance of muscular anomalies it is often overlooked that patients complaining of asthenopia were relieved on the whole about as satisfactorily and perhaps in as large a proportion of cases before the subject of heterophoria was ever brought out. It is true that heterophoria is a very common occurrence, but if we examine persons who do not complain of their eyes we find it as well, and often in as high a degree,

as in the patients who suffer from asthenopia. Such, at least, was my experience as related at the last International Medical Congress. Hence before we should admit any causative relation of an observed muscular want of balance, to the complaints of the patient, we should first determine whether the latter are not due to other well recognized causes, and test whether their removal will not obviate the asthenopia. On analyzing the conditions which accounted for the asthenopic complaints of 500 consecutive cases in private practice, I found that in 76 per cent hypermetropia, astigmatism or presbyopia were the only and sufficient cause, as proven by the results of their correction; 5.8 per cent. were clearly of nasal origin; 4.8 per cent. were cured by attending to an existing slight blepharitis; 2.2 per cent. depended on slight choroiditis; and in 1.2 per cent. the conditions in the eye were connected with progressive myopia. There remain 10 per cent. not due to these causes, but depending generally on neurasthenia, as manifested as well in other functions. In nine-tenths of these, the usual tests showed the muscles practically balanced. Only 1 per cent. of the total number showed a sufficient muscular anomaly without the apparent causes for the asthenopia, to raise in my mind the question whether the muscular strain were the cause of the subjective symptoms. As I could not get any benefit in these patients from temporary exclusion of one eye which necessarily obviates all muscular strain, I did not perform any muscular operations. From my own experience I have hence come to the conclusion, that asthenopia dependent upon anomalies of the recti muscles is certainly not a common condition. I can refer moreover to a common observation, which in my mind throws much doubt on the correctness of the prevalent belief in muscular asthenopia. The highest degree of heterophoria is that which is not continuously overcome by the muscular effort, but in which at times of fatigue the eye actually deviates. These are the cases formerly called latent squint. Such patients, however, do not complain of asthenopia, or if they do it is relieved by attention to their refractive condition. According to my experience these patients suffer from temporary diplopia, but not from asthenopia or other nervous symptoms.

At the request of the Society, Prof. Zehender stated, that as far as he is informed, partial tenotomies are not at present performed in Germany. At the time when von Graefe first recommended this operation for insufficiency of the interni—as it was then called—it was performed very often by him and other oculists. But it was soon learned that a partial tenotomy does not permanently alter the muscular relations, even when the primary effect seemed satisfactory, and that a permanent change could be better secured by a total tenotomy controlled by proper sutures.

DR. RISLEY—I wish to express my gratitude over the conservative tone which has characterized the discussion of these papers. In the management of the anomalies of muscular balance it is possible that in some instances too great enthusiasm and inadequate study of the case in hand has led some operators beyond the bounds of prudence. Indeed I have already seen the consequences of mistakes in this direction. I have under observation a gentleman suffering from incipient tabes, with impaired reflexes, lightning pains, etc., who had nevertheless had his external rectus cut for a supposed exophoria. I had another patient with impaired innervation from obscure nuclear disease, which had been overlooked and the externi cut by an enthusiastic surgeon; this, too, when a careful study of the relative strength of the muscles had shown but 6 degrees of abduction and 2 degrees of adduction. Fortunately no great harm could result under such conditions, but such instances demonstrate the necessity for great caution, lest the early symptoms of a nuclear palsy, or the incipient stage of tabes, which so frequently declares itself in transient ocular symptoms, should be mistaken for so-called heterophoria.

When attention was first called to this subject in its most modern phase, I could but wonder how I had succeeded in relieving so many people of their asthenopia, being unmindful of the reputed frequency of these anomalies of the vertical muscles and in a measure also of the external rectus. A more careful study of those persons who had not experienced entire relief from correcting glasses and careful attention to general health, soon convinced me that in a certain number of cases the trouble was due to some form of muscular anomaly. Within a few years I have succeeded, either by carefully adjusted prisms or by tenotomy, in greatly relieving a large number of my former patients and others. Therefore while mistakes may have occurred, and inordinate claims for the efficacy of tenotomy in curing diseases of the general nervous system may have been made, still I am sure there is too much of truth in these claims, and too much of real value in the careful study and treatment of heterophoria to relegate the whole subject to the realm of charlatanism.

DR. BAKER—I do not wish to convey the idea that there is nothing to be gained in the operations for heterophoria; in fact I make them, and possibly as often as any one here, (but not as often as some of my neighbors whom a friend of mine calls "post-graduate friends") and get good results in most cases. The point I wish to make is this: which are the operative cases? Not such a case as this: a patient came to my office some time ago in whom a so-called oculist had proposed an operation for heterophoria, and yet the patient had one and one-half D. of hypermetropia which had not been corrected. I gave him a pair of spectacles and his muscular insufficiency disappeared together with all asthenopic symptoms.

The muscular insufficiency in this case was caused by the error of refraction, as I believe it to be in ninety-nine cases out of a hundred. In nineteen cases out of twenty, if we correct the refractive error we will give comfort to our patients. In all, I prescribe lenses that fully correct the error of refraction and tell the patient to wear them a certain length of time, and if the symptoms of asthenopia do not disappear I then correct with prisms, muscular exercise or by an operation.

DR. MURRELL—I believe that this subject of muscle errors is very imperfectly understood by the majority of men in our profession. I confess I knew nothing of muscle errors until within the last year. I am just beginning to see light; that there is something in it there is no doubt. I take a very conservative view of this subject of operation. I have had patients bring their glasses back and object to taking them because they did not give entire satisfaction. Until I began to search for these muscle errors I could not find what the cause of complaint was. I have prescribed prisms in a number of cases lately, giving complete relief in a large portion. When a patient comes to me I first correct the refractive error, and then correct the muscle error by prisms, and if this fails to give relief I perform a tenotomy. Dr. Savage has devised means by which we can exercise the ocular muscles, and thereby develop them. The character of exercise set forth by him in a recent publication is rhythmic and must, in all cases, stop short of fatigue.

THE FIRST WOMAN M.D.—Mrs. Elizabeth Blackwell was the first woman in the Republic to receive the degree of M.D., a fact which is once more brought into notice by the accounts of the death of her sister-in-law, Mrs. Lucy Stone.

SOME REMARKS ON SQUINT AND ITS TREATMENT.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY J. H. THOMPSON, M.D.
KANSAS CITY, MO.

To all observing ophthalmic surgeons it is evident that the common operation for converging squint is by no means perfected, and, I am inclined to think that many of my hearers are willing to join me in the belief, that, of all the operations on the eye, excepting perhaps iridectomy in acute inflammatory glaucoma, that for squint is the most difficult, and yet, there is scarcely a traveling quack or recent postgraduate enthusiast who will not tenotomize a rectus muscle, at any time, on any patient, and for any fee. Some years ago I was regretting the difficulties in this operation in the company of some of the members of this section, when I was astonished to learn that, for some ophthalmic surgeons the correction of strabismus was child's play and almost beneath the dignity of an eye clinic. Why is this? Because in childhood it is very easy to straighten an eye, and the immediate effect is brilliant; but in a very large majority of cases the more satisfactory the primary operation, the more disastrous the remote consequences; at least, that has been my experience, not only in my own cases, but also in the cases of other operators, many of them excellent men. Therefore, I take it, a short paper on this subject will not be out of place.

I am much inclined to think that many people never acquire binocular vision, the visual apparatus being defective either in a want of commissural fibers between the two visual centers, or an abnormal relationship between these centers and the psychical areas in the cerebral cortex. It requires no greater stretch of the imagination to believe this, than to say that Daltonism depends upon a deficiency of certain color fibers in the optic nerve or brain. I do not mean that there is an antipathy to single vision, but that single vision is impossible, because of the inability of the individual to join the two cerebral pictures. Thus if binocular vision is not acquired, diplopia is a natural condition and does not lead to any embarrassment of sight, because the condition can not possibly be compared to binocular sight, of which the subject has no conception.

Not many days ago I examined a man 30 years old. He had alternating converging strabismus; in each eye tested separately, his vision was 20-18; he would use either eye; if he looked at an object to the left of the vertical plane, he would use the left eye and squint the right; if to the right of that plane, he would use the right eye and turn the left. No combination of prisms or colored glasses could excite diplopia. The man was hyperopic 2, 5 D. In this case the individual suppressed the visual field of the eye not in use at the time, as is evidently the case in birds and fishes. I have seen the same in young children with beginning squint.

Although there are reasonable doubts of the truth of this idea, it can not be denied that some children are born with defective vision in one eye. This congenital amblyopia will be discovered, if sought for, in very many, I may say the majority of children with beginning squint at a time of life when it can not be reasonably supposed that the partial blindness is the result of disuse. I have found this defect even in periodic squint, and in my experience it is so common that I consider it the rule rather than the exception, and that it is the predisposing cause of squint in many cases. That hyperopia is an exciting cause is evidently true; but we all know that young hypermetropes can overcome a high degree of refractive error without fatigue of the ciliary muscle, and are seldom called upon to assist accommodation by convergence. Hypermetropia even when combined with monocular amblyopia is hardly sufficient in itself to cause strabismus, because if we render the eye emmetropic with glasses, even at the time of periodic squint, there is no certainty that the deformity will disappear; and although some writers insist on such conservative treatment, the results are not satisfactory. I have tried it and I have not yet found the method successful. It is for this reason that there are some doubts of the correctness of Donder's teaching.

What relation the angle Y has to strabismus convergens and the influence the superior and inferior recti muscles have over squint is not fully determined, but it does seem to me that often the external recti muscles are not able to hold the optic axes parallel, especially since we know that the center of rotation lies outside of the vertical muscular plane, or the plane of the superior and inferior recti muscles.

This may in some persons be overcome, as in adults we find a high degree of prism can be borne in time, while in the beginning small angles excite diplopia. If from a high angle Y. or increased accommodative tension of the interni, the externi are fatigued, the eye tends to turn in, the child preferring monocular vision in comfort to binocular sight with pain. Again, there is another tendency to latent convergence, and that is that the center of rotation lies on the outside of the plane of the superior and inferior recti muscles. In health the tendency to rotate inwards is balanced by the action of the obliqui; so if from any cause, nuclear perhaps, these muscles fail in their duty, the external recti fatigue, give way, and squint results.

At an early date in my professional career, I felt convinced that it was not alone the tension of the internal recti muscles which held the eyes turned inwards in confirmed squint. I thought then, as I do now, that all the muscles which rotated the eye inwards played an important part, for it does not seem reasonable that a secondary contracture should alone attack the interni and leave the superior and inferior recti muscles intact. It is safe to consider that these two muscles are involved also in the pathological changes which go so far to hold the eyes crossed. It is only another step in advance to affirm that all the structures in the orbit, immediately surrounding the eye have altered their relationship to correspond to the false position of the eyeball, and of all such structures the capsule plays the most important part.

From the above, it is evident that the operation for squint is by no means such a simple procedure as many would wish us to believe, and that when a surgeon undertakes to correct the optic axes, he has a case before him which may require for its successful issue a most critical examination into its cause, a careful study of its condition and a most minute dosage in any operation that may be undertaken. As I have said before, it is not difficult to straighten

the eyes, but it is difficult to guard against failure, since the eyes may turn in again, or in time go out the other way. The conservative treatment advanced by our confreré, Dr. Ayres, has many supporters throughout the United States. It can not be denied that the continued wearing of glasses may cure some cases; but if I am not mistaken, the method is less satisfactory than the surgical means at our command. It has this advantage, however; it can be tried at a time of life when all operative procedures are to be condemned. I am not in favor of prescribing glasses for very young children, and I always feel when I see a baby in spectacles that theory has run off with common sense.

In squint depending upon simple hyperopia, when the vision of both eyes is good, binocular vision may be secured by a simple tenotomy and the wearing of correcting classes, providing the patient is less than thirteen years old and more than seven. For reasons well understood, in making a simple tenotomy the operation should be divided between the two eyes, and the cutting of the capsule should be in proportion to the degree of convergence. Stevens' method of modified tenotomy has immensely simplified this operation and makes it possible to accurately gauge the effect. Some of us are in favor of rotating the eye outward with a stitch, but I am afraid that this stitch has done more harm than good, for between the eighth and thirteenth year the stitch is rarely necessary, and if the operation is made on one eye at a time for full correction, it is positively harmful. I think it is better to under correct than over correct, for I see no objection to a second operation, or indeed a third; while insufficiency of convergence is to be deplored, downright divergence is shameful.

In cases where there is no hope that binocular vision can be attained, either because of well marked monocular amblyopia, or other causes, I believe it is best to combine tenotomy with advancement, which should be always capsular with or without division of the external tendon. This operation should not be undertaken on a patient under thirteen or fourteen years old. Why I favor advancement of the capsule is for the following reasons: in long confirmed squint we usually have contracture of the internal recti and other adductor muscles, together with stretching of the externi. This muscle is therefore relatively weak and may not be able, unsupported, to overcome the tendency of the eye to roll inwards, even after the tense structures are cut. So, there is danger that the muscle is advanced too much and that the capsule on the inner side of the eye is too extensively divided. Therefore to divert the eye with a limited tendo-capsulotomy requires too much pulling on the part of the advanced muscle, and after the stitches are removed, the new formed adhesive tissue may give way. To advance a muscle requires considerable dissecting, pulling with forceps and tearing with hooks, which add greatly to the possibility of infection, and since it is advisable to do this work without a general anesthetic, using cocain alone, the operation may be unduly painful.

In old cases of squint after the thirteenth year, I advance the muscle with the capsule, either operating on one eye and dividing the internal recti of both, or tenotomizing and advancing on both eyes. This operation has always been successful in my hands and I have not been compelled to try any one of the many methods suggested by authors or extolled by pamphleteers.

The reason why I like this operation, whether the tendon be cut or doubled up as suggested by De Wecker, is that the relation of the tendon to the capsule is not disturbed, and the adhesive inflammation consequent to a rather extensive wound of the capsule and conjunctiva binds the parts so tightly to their new position, that there is no danger of their giving way, even when the stitches are removed on the third day. Some may fear that the tension on the threads in this operation may tear them away, but since I make my stitches above and below the cornea, passing a flat needle through the episcleral tissue and perhaps the superficial layers of the sclera itself I have not known that to happen. I endeavor to place the stitches so that the converging superficial threads when tied make tangents with the cornea and do not touch its epithelial surface, avoiding irritation if not ulceration. I prefer a waxed thread, and when about to tie the muscle forward, I twist the corneal threads so that the point of convergence marks the position of the knot; thus accurately dosing the degree of advancement and foretelling any injury to the cornea after the knot is tied.

DR. SAVAGE—In order not to kill time I will make a few statements, and for the reasons on which these statements are founded I must again refer you to the last issue of my journal. One of two things must always be at the bottom of internal squint, viz: intrinsic esophoria and pseudo-esophoria. In most cases the two coexist. Other conditions, such as a corneal scar or an amblyopia are often associated with these causes. Hypermetropia, the cause of pseudo-exophoria, nearly always is found in cases of internal squint. True esophoria is rarely so great that the guiding sensation can not restrain it, but when a pseudo-esophoria is grafted into it, the two combined throw off the mastery of the guiding sensation and there results a *turning* where before there was only a *tendency*. The two forms of esophoria may be restrained by the guiding sensation for a long while (in most cases for a lifetime) when something disturbs the nerve centers and the esotropia occurs, the guiding sensation having lost its control. In all cases of internal squint the first thing to be thought of is the destruction of the pseudo-esophoria. This is readily effected by a mydriatic, the first effect of which, however, is to increase the squint by increasing the pseudo-esophoria. The pseudo-esophoria having been cured in this way, the true esophoria may be again brought under the control of the guiding sensation, the eye swinging itself suddenly or by degrees into line. In very young children the mydriatic is often enough to effect the straightening of the eyes. In older children the hyperm etropia should always be corrected to the fullest.

The correcting lenses unaided by the mydriatic, in some cases will cure the squint by removing the pseudo-esophoria, but in many cases the mydriatic must be made to aid the lenses because of a disposition, continued for a longer or shorter time, on the part of the eyes to cross when an attempt is made to fix on the near point. When squint is thus cured there always remanins the true esophoria which at some time may have to be treated either by rhythmic exercise or partial tenotomies. But the great majority of these cases of internal squint are brought for treatment at a time when mydriatics and lenses can not effect a cure. The balance must be done by tenotomies, complete when necessary, partial when possible. In all these cases the fully correcting convex lenses should first be determined, and an estimate be made as to how much of the condition

they will relieve. Then as little cutting of tendon and capsule should be done as possible.

Dr. J. L. Thompson—I had a patient, a little child only three months old, who had strabismus in one eye only. By using the atropin I straightened her eyes. I have had patients where the eyes turned in a good deal, in which I have used the mydriatic and glasses as early as the eighteenth month, who were very much benefited. In other patients I have operated on the muscle and have had success. In a certain number of cases we will never be successful by all the operative measures that have ever been devised. The only thing to do in these cases is to watch them. You will operate on a patient, getting beautiful results and ten years later you will have something that will not suit you at all—the eye turns the other way. These patients we feel like sliding on some one more sanguine as to results. We had better never have had anything to do with them. Concerning the question of amblyopia, I will say that I am satisfied that there are numerous cases where there is more than heterophoria that causes strabismus.

Dr. Hotz—I agree with the main statements of the author, and wish to make only a few remarks on the subject of advancing the muscle, inasmuch as I prefer the resection to the advancement of the weak muscle. I divide the tendon of the muscle, leaving a short stump at the line of insertion, then cut off a piece of the tendon, in proportion to the degree of convergence, and attach the muscle to its original place by stitching it to the stump. We gain several points by this method: in the first place we can gauge the effect to a certain extent by the size of the resection; we are sure we have a firm hold for our stitches, and they will not slip as they are so apt to do when they are run under the conjunctiva only; we furthermore know that the muscle will be held to the eyeball in exactly the same line that it was originally attached. But whether we do advancement or resection the operation should always be accompanied by the tenotomy of the contracted internal rectus muscle.

Dr. LeMond—If we were all of one mind in this department and never differing with each other, it is quite likely that ophthalmology would never have reached the stage of perfection and exactness that it enjoys to-day, but I must say that atropia in my hands has not been satisfactory; in fact, I rarely ever use atropia in connection with these kind of cases. In 98 per cent. of the cases of squint I have operated on in the last year (about fifty cases) I have had a decidedly unsatisfactory result in one case. I invariably find in these cases a vast amount of hypermetropia, and I really believe that in nearly all of these cases of squinting eye, hypermetropia is at the bottom of it. After the operation I correct the error of refraction and tell these patients that they will have to wear glasses from six to twelve months perhaps, but likely by that time they will be able to go and see comfortably without them. This course of treatment, with me, has been very satisfactory. In two cases I had to use the stitch to hold the eye in situ. I only do this where a complete tenotomy of the muscle has failed to put the eye on the same visual axes with its fellow. I prefer using the stitch to doing repeated tenotomies. I think the amblyopic condition is due largely to a great amount of hypermetropia. In my experience I have found the amblyopia confined to the squinting eye. I believe whenever we look more carefully to the eyes of school children the less squinting we will have, simply by applying the needed remedy, that of prescribing glasses. Statistics show that the Germans double and treble us in the number of glasses worn, according to the same given number of population. I think this proves to us, very conclusively, that they are just that much ahead of us in finding the early errors in refraction and correcting them.

Dr. Gibson—I want to make one remark only, in favor of the advancement that has been spoken of. It does away with that protrusion of the eyeball which we have as a result of a simple tenotomy. That I think a very essential thing to take into consideration. I have seen this protrusion quite marked in some simple tenotomy operations. Combined tenotomy and advancement certainly gives better results.

Dr. Risley—Do you measure the adduction by the image of light on the cornea?

Dr. Thompson—Yes, sir.

Dr. Thompson—I am much pleased with the interesting debate on my paper regarding the amblyopia of squint. I have been surprised to find in children two or three years old, the bad vision in the deviating eye, when that eye had only squinted a few days, certainly not long enough for the sight to fail from disuse. From such experience and from the tone of some ophthalmic writers I am inclined to think there is a great deal of doubt about the truth of amblyopia exanopsia. Children born with cataract and successfully operated upon some years afterwards do not as a rule show up blindness. If the effect of disuse be true in one class of cases, why not true in the other? The use of atropia in children for the correction of squint is not so far as I have been able to observe satisfactory. I have tried it for months and do not know that I ever succeeded. If the squint is entirely due to hypermetropia I think it may be overcome by glasses. Indeed all such methods should be tried before resorting to an operation. I have relieved squint in boys of 15 and 16 years of age by correcting the hypermetropia, for when the glasses were taken off the squint would return. I have never seen a case of strabismus corrected in a young child by operation but that when the subject grew to be 15 or 16 years old there was loss of convergence or direct divergence. I have operated on children and got the most magnificent results, but when they grew up to adult age I was ashamed of them and myself too.

EXOSTOSIS OF THE ORBIT.

Read before the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association at Milwaukee.

BY ROBERT FIELDS LE MOND, A.M., M.D.

PROFESSOR OF DISEASES OF THE EYE AND EAR IN GROSS MEDICAL COLLEGE, DENVER, COLORADO.

When I received a letter last fall from the president of the ophthalmic section of this distinguished body, requesting me to contribute a paper on this occasion, I immediately began to cast about for a subject upon which to write. In the selection of a subject I had three objects in view, viz:

1. One in which great need existed for its further development to a more successful and satisfactory termination, both to the physician and patient.

2. One in which there was sufficient gravity to claim the attention, interest and hearty coöperation of every ophthalmic surgeon present.

3. One in which I very much needed to be enlightened upon, myself, for I believe it was Archimedes who said: "If you desire wisdom, acknowledge your ignorance that your teachers may know where to begin."

I therefore present to you, the great godhead of ophthalmology, the subject, "Exostosis of the Orbit," a morbid condition which has successfully baffled the best skill that is known either in medicine or surgery to-day, because statistics show that over 60 per cent. of the cases which have been reported have succumbed, either to septic meningitis or pressure

upon the brain following the operation; and it is our duty, as benefactors of the human race, to make a great and united effort to overcome any evil which is claiming victims among our kind at the rate of from sixty to seventy out of every one hundred it attacks.

I think it is generally accepted as a fact by most writers upon the subject that three forms of exostosis exist: 1, the cellular; 2, the craggy or semi-cartilaginous; 3, the ivory.

The cellular exostosis is characterized by its being composed of an osseous crust, which surrounds a rather soft substance that is thoroughly supplied with a bony framework resembling the honey-comb somewhat, and it is thought originates from the periosteum. This form of exostosis rarely ever attains any great size and is disagreeable only on account of its cosmetic effects, as it never gives pain unless interrupted by a blow or pressed unnecessarily.

The semi-cartilaginous, or craggy form of exostosis, is composed of layers of craggy bone often interlaced with cartilaginous particles, as well as surrounded entirely by cartilage, and particles of periosteum may be traced about the tumor; but it does not make a complete covering and is found in patches only. This form of exostosis is more apt to attain a greater size than the cellular; it offers but little resistance to the surgeon and usually makes a good recovery. Many cases have, however, been reported which proved fatal, but it does not compare in point of mortality with the third class of exostosis, which I will now describe:

The third class is the ivory exostosis, which is by far the most formidable of all the osteomata yet described by any writer upon the subject. It is excessively hard and consists of perfectly developed, and very fine bone tissues. According to McKenzie, it originates in the diploë, presses the compact tissue of the bone before it, and forms a round, smooth and somewhat nodulated tumor. There appears to be one general characteristic of this growth, and that is, it seems to have an affinity for extending into the brain. Most cases which I have seen reported, in which an autopsy was held, show that the intracranial division was developed more rapidly than the outside portion.

Regarding the etiology of exostosis of the orbit, comparatively little is definitely known. It often supervenes upon periostitis or ostitis, and is thought by a number of writers to be of syphilitic diathesis, as a positive knowledge of syphilitic complications has been shown in a number of cases reported. Other cases have been known to have received blows about the eyes which have been given the credit of the exostosis, while still other cases have received falls of various kinds, ranging from early childhood up to 25 or 30 years of age, and a number of cases have been found to have fractures of the bones of the orbit. As, however, this disease appears about equally divided between the sexes, I think the theory of falls and blows plays but a small part; for what boy has not fallen times beyond mention and narrowly escaped death, time after time, from blows of various kinds and intensities? They would not be boys were not this the case; so I think this practically excludes one of the prominent causes referred to by most writers. Again, it is thought by others, that the osteoma is due to a diseased condition of the frontal or ethmoid bone, or of the frontal sinus, and that the parts mentioned are possibly wanting in some of their elements. Others, again, advance the idea that it is possibly due to digestive disturbance or a want of proper assimilation and appropriation of the elements of food matter; that the superabundance of alkalin reaction being present, the system is filled with bony material and thereby develops the osteoma in seeking an outlet.

These osseous tumors are usually very hard to the touch, showing, even at an early stage, a remarkable amount of resistance. They are usually slow in their development and it is something unusual for any pain or inflammatory action to be present, though in a few exceptional cases much pain has been experienced.

The degree of exophthalmus, impairment of vision, rotation, and general movement of the eyeball will, of course, be entirely dependent upon the extent and situation of the exostosis.

According to the best authorities, in the early stages of this trouble the treatment should be the promotion of all means of absorption by the internal administration of pot. iodid, and a thorough saturation of the tumor locally with mercurial ointments. The patients' general health should be looked after closely and not allowed to become depleted or run down; they should be supported by good, generous diet, and encouraged to travel or reside in the country. If the tumor is small and giving no special inconvenience and appears to be merely existing without any apparent activity, it should not be disturbed but quietly let alone. But when we find by watching the case for a time that the osteoma is gaining on us, I think the surgeon should not hesitate to advise an operation at once.

A very large per cent. of exostosis occurs in persons under twenty-four years of age. In some cases it has been discovered in babes as young as one or two months old, and in one case was found to exist at birth. But a large majority occurs between the ages of ten and twenty years, and attacks about one out of every thirty thousand cases of eye trouble. Bornhaupt collected eleven cases of exostosis of the orbit which were operated upon, and out of that number, seven died of septic meningitis (63 per cent.); two cases recovered, and two were lost sight of and the final results of these operations were never obtained. Berger and Tryman collected nine cases which were operated upon, six of whom died (66 per cent.).

The mortality does not appear to vary to any great extent in all the collected reports I have been able to examine; from the recorded experience of some one hundred authors in this department of surgery, the average mortality will be some 65 per cent. I thought it best to be brief and not weary you with tabulated reports, and will now go on to describe a very unique case which was referred to me recently by Prof. W. H. Davis of Denver:

Mr. R., aged 24, a very large and well-proportioned man weighing 190 pounds, complained of double vision and a blurring of the right eye; in addition to the above symptoms there was also quite an enlargement on the lower orbital bone of the same eye; it was continuous with the lower orbital bone throughout its whole extent. It also extended upward nearly three-quarters of an inch; and backward continuous with the floor of the orbit to near the optic foramen; the enlargement at this time was about the size of a pullet egg. He had quite an exophthalmus which pointed upward and outward. The line of vision in the right eye was at an angle of about 35 degrees from that of

the left eye. There was little or no inflammatory action present, nor had there been at any time since the beginning of the enlargement, which the patient said was about twelve months before. He said it had never given him pain, or troubled him in any way, except by causing the defect in vision and a continuous diplopia. His vision in the right eye, at this time was 7-20. He was raised on a Missouri farm, and gave an excellent family history, having never had any serious sickness in his life. His parents were both living, as well as several brothers and sisters.

The ophthalmoscopic examination showed no organic change, but there was a slight tortuosity of the blood vessels of the retina. There was positively no tuberculous or syphilitic diathesis in this patient's family history. I had him visit my office continuously for several days until I was thoroughly satisfied that my diagnosis was correct. I told him that I was sure that, at the past rate of the development of the tumor, we would very soon be forced to do one of two things: chisel off this bony mass which was encroaching so rapidly upon the eyeball, or perform enucleation. After advising with some of the members of his family who had accompanied him to Denver, he decided upon the former, and on the 17th of December, 1892, I performed the operation with the assistance of Dr. Coover.

The patient being completely anesthetized, I made a horizontal incision, commencing about six lines below the internal canthus and extended it to a little beyond the external canthus, cutting entirely through the integument down to the periosteum. I then dissected the flap up, until it could be laid back upon the superior orbital bone, which was held by my assistant. I then dissected up the periosteum and began chiseling into this bony mass, and I very soon concluded that I was pretty much in the same condition as the old pioneer, who wished for some one to help him turn the wildcat loose, as I could see by the way it completely annihilated the edges of all my chisels that I had a hard job on my hands. I took a very small chisel and succeeded in drilling several small holes into this bony mass; then, by means of bone pliers connected these holes, which gave me a leverage, by which I was enabled to pry off a number of pieces, thereby reducing this bony mass about two-thirds of its size. I then attempted to pry another piece out of the floor of the orbit, knowing that it would add very much to the utility of the eye, but in this effort I was completely foiled, as it was so unyielding that I felt if I brought to bear any more weight on my pliers I should certainly burst through, and possibly put my patient in a condition to need an undertaker instead of a physician. So we decided that it was wisest to proceed no further, as we felt that the operation so far would be in a measure successful, having reduced the tumor at least two-thirds of its size. I then dressed the wound antiseptically, using a bichlorid of mercury solution, 1-5000, about as hot as it was comfortable to bear, giving the wound a thorough drenching. I then drew the flap down and bound it in its former position with about half a dozen stitches; then bandaged his eye, ordering the nurse under no circumstances to disturb the bandage until I saw the patient the next day. The patient rested very well that night, and felt fairly comfortable the next day. There was quite an inflammatory reaction of course, but this soon subsided and the healing process went steadily on to complete recovery, leaving scarcely any scar. After seeing him every day for about one week, I dismissed him, telling him, however, to call occasionally and let me see how he got along. He visited me occasionally for about one month. By this time there was comparatively slight variance in the eye from its fellow; the diplopia was completely gone and his vision measured 20-30 in his right eye; and believing that I could render him no further assistance, I dismissed him finally, feeling that I had every occasion to be thoroughly satisfied with the result obtained.

Dr. Knapp—This is certainly a disease which is extremely important. The majority of these tumors are in the upper-inner part of the orbit, and spring from the frontal sinus. A goodly number are on the nasal side of the orbit and originate in the ethmoid. I had a patient on whom I operated for a tumor of this kind four hours, and got out only a small portion of the tumor itself. That man had attacks of meningitis and died eleven weeks after the operation. The tumor formed in the frontal sinus and penetrated into the skull. Such cases you see in large pathological museums, especially those in London. Hence the former advice: leave these tumors alone. I operated on a gentleman, age 44, about thirteen years ago. The tumor was larger than a walnut. I got it out by the method which Maisonneuve followed in removing a large intransal osteoma, viz: by subperiosteal enucleation. It took me a whole hour. The patient made a rapid recovery without suppuration. He is living, healthy, and no one now could discover from which orbit the tumor had been removed. The method is essentially followed in the removal of all growths, not by attacking and removing them piecemeal, but by shelling them out from the neighboring sound tissue. It has done me good service, particularly in cases of ivory exostosis of the orbit and the external ear canal.

Dr. Jackson—The case I reported last year has continued well, so far as I know. In that case I think it was a necessity, in order to remove it without enucleating the eye, to divide the tumor before trying to take it out. It was of excessive hardness, but after breaking several instruments I found that it could be pierced by a hand drill.

Dr. Allport—In this connection, I would say that I had a case of exostosis of the meatus some time ago that I successfully removed with the dental engine; not with the drill, however, but with some sharp burrs. The burrs became dulled occasionally during the operation, and had to be replaced by others that were new and sharp. I simply commenced burring at the apex of the tumor, and continued smoothing away the growth until the level of the meatus was reached. I have also used the dental engine in the same way, in some mastoid operations, and consider it an excellent method of operating when the burr is used and the bone substance gradually thinned away until a generous opening is produced. It is much safer than either the mastoid drill or chisel for obvious reasons.

Dr. LeMond—We are very much pleased to have Prof. Knapp present with us, and I feel complimented to have him discuss my paper. As I went over carefully his recorded experience I found it more extensive than any surgeon's in the United States on exostosis of the orbit. I am very much pleased to have heard what he had to say. In the last few months I have done two operations for exostosis of the external auditory canal. I had begun to think that perhaps I had better change my title and set up altogether for diseases of this character. I did both of these operations by means of a dental engine and a small chisel. One of these cases, a gentleman 36 years old, told me this exostosis had been forming for about five years. It had completely occluded the external auditory canal and rendered

it almost impossible for the ceruminous discharge to be removed. I took pieces of this bone to a professor of pathology and had it examined, but it was found to be nothing but the ivory character of the exostosis.

I beg pardon, Mr. President, for having digressed in mentioning the exostosis of the external auditory canal, and would not have done so had not one of the gentlemen, in discussing my paper, introduced the subject. I was glad, however, the gentleman referred to it because it is a subject in which I am very much interested; and more especially at this meeting was I anxious to hear it discussed, from the fact of its being such a rare affection that it is a hard matter to get information regarding its characteristics. I have enjoyed the discussions of this hour, and was anxious to be enlightened upon this rare field of surgery.

I desire to thank Prof. Knapp, especially, for the kindly manner in which he handled my paper.

OPTIC NERVE TROUBLES ACCOMPANYING OR FOLLOWING FEVERS, ESPECIALLY TYPHOID FEVER.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY JOSEPH A. WHITE, A.M., M.D.
RICHMOND, VA.

I must apologize in advance for the paper I here present to this section, but I do so because I want to awaken a discussion on a subject in which I am deeply interested, and may thus be a poor means of obtaining a good result, on the somewhat equivocal ground that "the end justifies the means." In my experience I have met with many cases of optic nerve atrophy that followed so closely on typhoid and other fevers, that there is every probability they were the result of the pathological conditions attending these diseases. Whether they commenced as optic neuritis, which could be ophthalmoscopically demonstrated, or whether they followed on post-ocular alterations in the optic nerve without ophthalmoscopic symptoms could not be determined. But in all probability there was neuritis, or compression with or without papillitis, followed by atrophy.

We all know how difficult it is to settle a question of this kind, without regular systematic investigation, by examining a series of such cases during the attack of fever. Post-febrile amblyopia or optic nerve atrophy might be due to brain complications, or to general systematic exhaustion following the disease, or more rarely to excessive use of quinin in treating some fevers. But may they not also be the result of neuritis, or of compression of the nerve due to the pathological alterations brought about by the specific virus of such diseases as measles, scarlet, typhus, typhoid, malarial and other fevers? If this should be true, would not an early recognition of the eye trouble save, by prompt treatment, many an eye that would otherwise be lost? It has not been very long back, that so little attention was given to the ear trouble accompanying scarlet fever that many a person lost hearing or life or both as the result of this oversight. Has not the investigation and teaching of the aurist on this subject been productive of great good, saving many a person's hearing, and life as well?

That text-books say little or nothing about optic nerve troubles accompanying or following fevers, that the literature on the subject is very meager, proves nothing, except that no one has investigated it systematically or scientifically. It only shows that this is one of many open fields for research that may repay the labor. More eyes are lost from atrophy after febrile affections than one would suppose from reading the available literature about this matter. There are few of us who have not seen such cases.

In looking up the subject, I wrote a few lines to about thirty ophthalmic surgeons scattered over the country east of the Rocky Mountains, asking their experience and enclosing an addressed envelope for a reply. Twenty-two of them sent in a prompt and courteous answer; six (Drs. Knapp, Burnett, Noyes, H. W. Williams, Gradle and Savage) said they had little or no experience in optic nerve troubles in cases of fever; one (Dr. Calhoun), that he could not recall his cases of this nature, but was satisfied his record book would show he had met with them; Another (Dr. Hotz), that his record would show cases of neuritis and atrophy, supposed to have been due to typhoid fever, although he did not consider such cases valuable for statistics; Dr. Risley wrote that he had seen cases of atrophy following spells of continued fever diagnosticated as typhoid, and also one case of neuritis after measles; Dr. J. L. Thompson has observed atrophy of the optic nerve following typhoid fever; Dr. Ed. Jackson wrote that he had seen cases of post-neuritic atrophy ascribed to typhoid fever, but careful questioning as to symptoms gave him the impression that the cases were either cerebro-spinal meningitis, or typhoid fever complicated with meningitis; Dr. L. Kipp has met with cases of atrophy after typhoid.

Dr. Michel said the cases of optic neuritis seen following so-called typhoid fever were more probably due to meningitis; Dr. Charles Stedman Bull wrote that he had observed many cases of optic nerve trouble in fevers, but had not time to go over his cases in detail; Dr. Oliver wrote me nearly the same thing as Dr. Bull, but said he would send me notes of his cases; Dr. L. Connor has never seen neuritis, but has seen atrophy ascribed to typhoid fever, and which was probably the result of the pathological conditions that obtain in the fever; Dr. Eugene Smith has had several cases of atrophy after fever, but never had a chance to examine a case during the attack; Dr. de Schweinitz has seen one case of slight superficial optic neuritis in connection with malarial fever. In another case with double optic neuritis in a colored girl supposed to have typhoid fever, the autopsy revealed tubercles in the meningitis, and the meningitis was probably responsible for the neuritis. In two other cases he has seen choroiditis and secondary atrophy of the optic nerve after typhoid fever; Dr. P. D. Keyser has seen very few cases of optic nerve trouble after typhoid fevers, but has met with atrophy after typhus. Dr. Alt has never seen real and lasting atrophy following fever alone; Dr. Samuel Theobold has never seen pure optic neuritis following typhoid fever or malarial fever, but has notes of a case of choroido-retinitis (and probably neuritis but the media were too cloudy to determine this point) which developed on the seventh day of a severe case of typhoid fever in a child who died three days after the eye symptoms were manifested; Dr. Würdeman has seen cases of optic neuritis as a result of typhoid, scarlet and other

fevers where there has been meningeal complications, and they were followed by more or less atrophic degeneration. A remarkable exception to this experience was a case of cerebro-spinal meningitis, which became perfectly blind and showed symptoms of optic atrophy in November, 1892, yet in January 1893, began to recover vision and by the end of March it was entirely restored.

Now this consensus of opinion goes to show that optic nerve troubles accompanying or following fevers are commoner than supposed. Foerster (in Graefe-Saemisch) speaks of atrophy of one or both nerves following typhoid fever; Gowers (Medical Ophthalmos. p. 279) says: "Loss of sight has been many times observed during convalescence from typhus or typhoid fever, and subsequently atrophy of one or both nerves. In some cases when the eye affection was early observed optic neuritis was found. Commencing atrophy may be observed without proceeding inflammation, or double neuritis may be present;" Hutchinson (Ophthal. Hosp. Rep. lx p. 125) recorded the case of a boy whose sight failed after a fever with typhoid symptoms, and of a sister with a similar condition. Symmetrical neuritis was found in both; Dr. Stephenson recorded (Transact. Ophthal. Soc. Vol. viii. 1888, p. 250) a case of double optic neuritis after measles, when there had been no sign of meningitis; Dr. Wadsworth (Trans. Ophthal. Soc. 1880, p. 125) has recorded some interesting cases after measles; Betke, Phlüeger and others have observed neuro-retinitis in scarlet fever.

Loring (Textbook of Ophthal. Vol. ii. p. 203) speaks of neuritis in connection with typhus, typhoid and other febrile disturbances. But adds that when it occurs in cases of fever, especially where there is delirium, that there is reason to believe there is meningitis with the fever. This statement, however, does not accord with the known pathology of typhus, typhoid and most other febrile affections. Meningitis is a very rare complication. Sir Wm. Jenner never saw it in typhoid fever. According to Osler in the 2,000 Munich cases it was only observed eleven times. Head symptoms are not always a sign of it. We can have delirium without meningitis. Arteritis with embolism is oftener found, and thrombosis still more frequently.

On account of the rarity of meningeal complications in typhoid fever, and still seeking to make meningitis responsible for the neuritis, both Leber and Stellwag Von Carion suggest that when neuritis is present, cases of meningitis have been confounded with typhoid. There is no necessity to look for meningitis to explain the presence of optic neuritis or optic nerve compression with or without papillitis, because in nearly all cases of typhoid there is more or less cerebral congestion with serous effusion into the arachnoid cavity, lateral ventricles and subarachnoid space; sufficient explanation, on Schmidt's or Parinaud's theory, of optic nerve changes. Moreover it is well known that neuritis may occur as an idiopathic affection, with great obscurity as to causation, unless we can refer it to some vasomotor disturbance.

In this connection, allow me to present three cases from my record book, all of which may be of interest:

1. A case of optic neuritis after typhoid fever that recovered.

2. A case of atrophy after typhoid that has steadily improved under treatment.

3. A case of perfect blindness after malarial fever which recovered perfect vision.

Case 1.—Miss E. W., called to see me in September, 1885, complaining of absolute inability to use her eyes. She was just recovering from an attack of typhoid fever which was of short duration; was not very severe in type and not attended by any marked head symptoms. Accompanying the difficulty of vision there was considerable photophobia. Examination showed marked neuritis. The swelling of the nerve measured one dioptric. I attributed neuritis to the effect of the pathological alterations in typhoid fever. I put her on iodid and bromid of potash; used dry cups to the temples because her health had not been entirely restored. I saw her occasionally during October, November and December. Her treatment during this time was directed to building up her general health and getting rid of any inflammatory changes about the optic nerve and the papilla. At first she made such little headway towards recovery that I feared optic nerve troubled might be followed by atrophy, but she began to improve, although she had not recovered entirely when she left me in December.

In October, or a month or so after she came under my treatment, her family were so much worried about her condition that I proposed a consultation, and their family physician selected an oculist in another city, who was a well-known member of the Ophthalmological Society, and without any suggestions on my part, or without being aware of my diagnosis, he came to exactly the same conclusion; that it was a case of neuritis with considerable swelling about the papilla. She left Richmond in the early part of 1886, and in March of that year called to see me, and stated that she had been entirely relieved, simply by the adaptation of glasses fitted by an oculist whom she consulted and who told her that she not only had no neuritis then, but that she never had had any. That the trouble was entirely due to the astigmatism, and would disappear, and there would be no return of it if she wore her glasses. I examined her and found that she had no trace of neuritis remaining; it had entirely disappeared and the nerve was normal.

Now, in this case I might have accepted the dictum of the gentleman who put the glasses on her, had it not been for two facts: one was, that it was not a simple congestion and blurring of the disc, but a swelling from three-quarters to one dioptric. Her condition when I first saw her was such that it might be denominated "woolly disc." The second fact was, that on March 24, 1882, three years and a half before she had the typhoid fever, the same lady had been a patient of mine, and on turning to my record book I found this diagnosis: "Nerve congestion, asthenopia, astigmatism against the rule. R. E., 0.50 Dc ax. 90 deg. L. E., 0.50 Dc ax. 60 deg." At that time the cloudiness about the optic nerve and the asthenopia disappeared after the glasses were adjusted. I was therefore in a position to recognize in this case the difference between an apparent optic nerve congestion accompanying astigmatism, and a true neuritis which developed after typhoid fever. Had the gentleman above referred to been aware of these facts he might have been more charitable in his remarks. In this connection it may be of interest to note the fact that her brother had also neuritis following typhoid fever eleven years previously. He was taken sick on June 6, 1874, at 17 years of age. The fever continued eighty days. The attack was very violent characterized by delirium, coma, etc. when at its height. The diagnostic symptoms were the regular rise and fall of temperature, pain and tenderness in the right iliac region, rose spots, typical tongue and diarrhea with yellow ocher stools. When convalescing, had trouble with his eyes, which were examined by Dr. Howell Thomas an oculist of Richmond, who stated he found neuritis, shown by "woolly discs." This report I received from Dr. John N. Upshur, a prominent physician of Richmond who attended both cases, and from this report I

should not consider he has confounded meningitis with typhoid fever.

Case 2.—R. H. S., age 28, of Clifton Forge, Va., was sent to me by his physician on April 24, 1893, for treatment of his eyes which had become defective during an attack of typhoid fever, commencing July 4, 1892, and from which he did not fully recover until October, 1892, nearly four months. His sight continued to grow worse in spite of his steady improvement in general health. When I first saw him, both optic nerves showed decided atrophy of the discs. His vision was right 5-200, left ½ 200. I put him on strychnia sulp. and dil. phosphoric acid, grains two to the ounce. He commenced with 10 drops of this mixture after meals, and increased one drop each dose without showing any toxic symptoms until he was taking 52 drops, or one-fifth of a grain of sulphate of strychnia at a dose. On May 4 vision was, right, 12-200, left 5-200; May 10, right 14-200, left 12-200; May 13, right 16-200, left 14-200; May 18, right 20-200, left 17-200, which indicated a steady improvement, as the right eye had four times as much vision and the left thirty-four times as much as at the first examination three weeks previously. The type was changed at each examination so that he could not bring his memory to aid his sight and give false results. When he reached the dose of one-fifth of a grain three times daily he showed decided toxic symptoms, when it was reduced to one-seventh of a grain, and he still continues the treatment.

The case is interesting, both as one of white atrophy following typhoid fever (originating probably as neuritis or papillitis), and as a case of atrophy that made steady improvement under treatment, although he had been nearly blind several months.

Case 3.—Nellie Kilmartin, age three and a half years, was sent to me October 11 by Dr. John Herbert Claiborne, Petersburg, Va. She was perfectly blind in both eyes, could not distinguish a bright electric light in a dark room. The right optic nerve was slightly blurred in outline and decidedly pale; the left gave a perfect picture of neuritis descendens. She had been sick two or three weeks with fever closely resembling remittent, supposed to be of malarial origin. She was given 2 to 3 grains of quinin daily for three or four days until she had taken 40 grains in all. She complained of some headache and said her eyes hurt her, but had no signs of meningitis. I put her on iodid of potash in gradually increasing doses until she showed its physiological effects and then added strychnia and dil. phosphoric acid to the treatment. She was brought to me regularly about once a week until the end of December. After the first week she began to see light and from that time steadily improved. I saw her the latter part of February, 1893, and her sight was perfectly restored, both optic nerves being normal.

This case of neuritis I attributed to malarial poisoning, as I thought the others due to the pathological alterations attendant upon typhoid fever, on the grounds above given. I have no comments to make and simply submit them for discussion.

NOTE.—Dr. Oliver has since written referring me to his articles in Vol. IV of Keating's Cyclopedia, and Vol. II of Burnett's System of Diseases of the Ear, Throat and Nose, for his views on this subject.

DR. DE SCHWEINITZ—When I wrote to Dr. White concerning his experience with optic nerve atropy in fever, I was under the impression that he wished data only in so far as typhoid fever was concerned. I was not aware that the Doctor intended to cover a more extensive ground; otherwise I might have added other cases to those which I had reported. I indorse thoroughly Dr. White's use of strychnia in optic nerve atrophy, especially its use in full physiological doses, believing that by these alone good results are produced, while practically no effect is achieved by the ordinary doses which are administered. In discussing blindness after fevers it was very essential to eliminate the possible influence of quinin, which I have no doubt Dr. White has done in his case, and which, indeed, was practically excluded by the exceeding smallness of the dose. Nevertheless, small doses of quinin in patients exhibiting idiosyncrasies are quite capable of producing blindness. I have seen temporary amaurosis follow the administration of 15 grains of quinin in divided doses during twenty-four hours, and Dr. Horatio Wood of Philadelphia, has reported a like result after the exhibition of 12 grains.

DR. WHITE—Dr. de Schweinitz seems to think that there was a possibility of this case being blind from the use of quinin, a thing which I carefully considered before attributing the blindness to optic nerve trouble caused by the fever. I have never seen as little as 2 grains of quinin at a dose produce blindness. Two or three grains daily until she had taken 10 grains would hardly have been sufficient to produce an effect like this. I have seen cases where blindness was apparently produced by malarial influence before quinin was given. These cases usually recover.

ECCENTRIC POSES OF THE HEAD.

Read in the Section on Ophthalmology at the Forty-fourth Annual Meeting of the American Medical Association.

BY J. ELLIOTT COLBURN, M.D.
PROFESSOR OF OPHTHALMOLOGY, CHICAGO POLICLINIC.

In the following paper I wish to call attention to a few cases illustrating a large class of malpositions and eccentric poses of the head, due to lack of equilibrium between the motor muscles of the eyes. These malpositions are assumed by the patients, either to prevent diplopia in paralysis, or to relieve the strain put upon weak or illy balanced muscles. Such cases are frequently referred to the orthopedic or general surgeon as wry-neck or spinal curvature, and in a case now under my care, an operation upon the neck muscles was seriously considered for the relief of an eccentric pose, due to insufficiency of the right exterior and superior recti.

Case No. 1.—Patrick K., strong, well built, and despite his defective eyes, well educated, applied to me in July, 1887, for a correction which I found to = O. C. + 3. G. S. + 1.25 cyl. ax. 90. V. = 20-30. He carried his head thrown back, mouth partially open and nostrils dilated, thus presenting a most ungainly and unprepossessing appearance. In this, the habitual pose of the head, he had binocular vision and had experienced no inconvenience except that attributable to ametropia. With head erect and in the normal position he suffered annoying diplopia, vertigo, and after a brief enforcement of this pose a severe headache with nausea. The muscle test with prisms, head in normal position, gave a constant right cataphoria 15 degrees, exophoria 10 degrees. There was no evidence of ptosis. Repeated examinations giving about the same result, I made an advancement of the superior rectus of the right eye and a tenotomy of the opposing muscle. Two months later we found that he carried his head in almost the normal position, and when reduced to the normal manifested 2 degrees of hyperphoria. This was corrected by a tenotomy of the superior rectus of the right eye, leaving an exophoria = 2° with abduction = 10° = adduction = 20°.

As the patient now maintained his head in the normal position and complained of no asthenopia, I advised him to return in a year, or sooner if he experienced annoyance. Almost two years elapsed, however, before his return, and upon reëxamination I found no exophoria, asthenopia or any symptoms that could be attributed to his eyes, both pose and movement of the head being normal.

Still another case involves about the same muscle condition, but in addition to the pose of the head the patient was subject to epileptiform attacks, occurring one in two or three days. History as follows:

Case No. 2.—Mary R., age 15 years, strong, well developed, and in good health but [illegible] the fits to which she was subject.

The patient rarely attempted to pose the head in a normal position, always complaining of vertigo when attempting to do so. The only way in which it could be avoided was to throw the head far backward. In this position she could see objects on the horizon line without other annoyance than that due to the position of the head. When the head was firmly held in the normal position, and the eyes were directed to the horizon line, there was found to be right-hypo-exophoria, i. e., the right eye was directed down and outward. Under atropin vision = 20-80, which was corrected by + 1. D. In order to correct the muscle error, the right superior rectus was advanced and a guarded tenotomy made upon the inferior rectus. Later, the right externus was cut and the internus advanced. In about two months after the first operation the head could be carried constantly in the normal position, and the eyes soon gained the normal freedom of movement. There still remained a tendency outward of 3 degrees which was not corrected. About a year later, and following the first menstruation the epileptiform attacks ceased.

Another type of malposition sometimes obtains in patients afflicted with esophoria or exophoria. A case evincing this occurred in a lad of 14, in good general health, and who presented no nervous or other symptoms of disease; the left side of the face, however, was illy developed. He habitually inclined his head to the right with a disposition to open the mouth unsymmetrically, the left angle being more obtuse. The eyes were directed strongly to the left; in this position vision was 20-20 and binocular. The head placed in the normal pose gave an exophoria = 15° to = 20°, adduction =0, abduction =25° test with prisms in appropriate position. The image was inconstant.

I made double tenotomies of the externi and advanced the internal rectus of the left eye. Five days after the operation the exophoria = 5° remained constant and two months later I again tenotomized the left external rectus obtaining 1 degree of esophoria. The patient was discharged with directions to return in three months at least, and sooner if further annoyance was experienced. Subsequent examination, head held in normal position, gave no evidence of heterophoria.

Still another form of malposition gives its unfortunate possessor a decidedly repulsive aspect. The head is bent forward, the chin is markedly retracted and the features often mold themselves into an uncanny grimace. These patients have binocular vision with the head in the above described position, but directly the head is adjusted to the normal pose a heterophoria is manifested. Young patients frequently struggle violently to resume the malposition.

Case No. 3.—G. K., age 17 years, maintained his head in this distressing posture, displayed an awkward staggering gait, nervous and illy coördinated movements of the head and body. V.=20-60, hyperopia = + 2.50 D. O. S. hyperphoria = 3 degrees, esophoria = 10 degrees (adduction 40 degrees. abduction 0 degrees). He was given a full correction. There was no improvement in position or coördination, therefore I concluded to correct the left hyperopia. This was done by graduated tenotomy and advancement respectively of the superior and inferior recti in the right eye. Two weeks later as there still remained 10 degrees of esophoria I made a double guarded tenotomy of both internal recti resulting in an esphoria of 1 degree.

Much difficulty was experienced in compelling patient to maintain the normal pose of the head, but in an exceedingly brief space of time his gait, appearance and manner of speech were much improved. Four months later as some esophoria still persisted, I again tenotomized and fully corrected the error. This patient was particularly unfortunate in his infirmity, as from early childhood he had been exceedingly sensitive regarding his appearance, and greatly mortified that even under the instruction of the best masters, he had been unable to amend for any appreciable length of time his noticeably eccentric attitude. The correction operations effected such a surprising transformation, that after an absence of some months from his family they were enabled to recognize him only by his voice. I have never seen so complete a metamorphosis in one's appearance as he underwent. I regret that I am not allowed to present photographs. In order to give an idea of the full extent of the affliction, these patients must be seen while moving about and not aware that they are observed.

In these cases there may never be a history of strabismus; the patient from early childhood adjusts the head to the position best calculated to avoid diplopia, and frequently there is no history of asthenopia or any symptom that could be classed as neurasthenic.

Still another modification of this form may obtain where it is not a question of double vision, but of muscle deviation involving both superior recti and not uncommonly the levator palpebrarum, and more or less stenosis of the aperture. Such cases demand tenotomy of the inferior and advancement of the superior recti and levator palpebrarum, and a free canthoplasty to correct the malposition. Canthoplasty, advancement of the levator palpebrarum, tenotomy and advancement of recti muscles all can be accomplished in the above mentioned routine at a sitting; still I consider a more preferable method includes the canthoplasty and advancement of the levator in a first operation, and some weeks later, the operation upon the ocular muscles proper, as the correction of the ptosis and aperture may, in a degree, modify the operation for the recti muscles.

These are typical cases and subject to many modifications; in none of them did I find a history of nervous disturbance occurring at any time. The only symptoms simulating the latter condition were the tendency to incoördination, grimacing and awkward posing of the body. It requires great patience, some tact and a thorough study of the conditions governing these cases to properly correct such errors. From these causes of malposition must be eliminated maladjustments of the neck muscles, deformities of, and injuries of the head.

A Case of Malposition following an unguarded complete tenotomy.—Chas. T., 15 years of age had been operated on for strabismus four years previously, and judging from my knowledge of the operator's work, there had been performed a complete unguarded tenotomy and no examination made to correct an existing hyperopia. The left eye was directed out with slight tendency downward, the right followed, and binocular vision was secured by posing the head backward and to the right. The movement of the left eye was limited toward the nasal side allowing but two milliamperes, from median line in that direction. When the head was forced into the normal position the right eye was five milliamperes above its fellow. An examination of the cicatrix showed broad and extensive adhesions. After staining with India ink the sclero-corneal junction to mark the normal position of the muscle, I made an incision and found the muscle attached below the equator of the eye and quite far back. Advancing and raising the muscle to its normal position, I secured it by a double armed suture. After recovery from the operation the patient was ordered to use his full correction under atropia, and to return in six weeks. Upon his return 4 degrees exophoria persisted; we tenotomized the external rectus; this fully corrected the error and head and eyes resumed their normal position. These cases are not so infrequent following the old operation for strabimus.

Malposition due to partial paralysis of the recti mus-

cles allowing the eye to move only to the median line and fixed for a definite distance.—This form of anomaly is one of the most annoying with which we have to deal. There is no position in which the head can be placed to secure uncomplicated proximal vision. This is especially distressing if the patient be so unfortunate as to be unable to suppress the image of error.

Case No. 4.—Mrs. H., age 23, had homonymous strabismus with fusion at 2 mm. pose of the head to the left or right, head in normal position, at 20 feet, esophoria = 15°, adduction = 40, abduction = 0°; movement of the eyes limited to median line; left eye no power of abduction; vision 20-30, under atropin + 75 O. D. and O. S. gave 20-20.

At the request of our patient we tried everything adapted to correct such errors; galvanism, faradism, massage, stretching, etc., of the externi muscle, in the endeavor to tone and stimulate the interni preparatory to tenotomy and advancement. Three months of unremitting effort secured an abduction of + 30; a guarded tenotomy and advancement gave adduction 30° abduction 2° with normal position of the head, and freedom from a constant vision of the nose. Abduction continued below normal, but for central and proximal vision there was no annoyance. In this case I advanced the external rectus of the left eye and made two tenotomies on each of the internal recti at different times before I secured central remote fusion.

This patient has lately called upon me again, complaining of severe pain in the right eye, following every attempt to move the eye even to the median line. Muscle tests showed that there was an esophoria, or tendency of the visual lines inward equal to 8 degrees; but the total displacement inward (Landolt perimeter test) was, right eye fixing, left eye tended in 12 degrees, showing a tendency to pose the head slightly to the right in attempting to look at objects either at a proximal or remote point. As the patient would not adjust herself to the abnormal relation existing between the eyes, and I could not persuade her to wear prisms, I corrected by making a guarded tenotomy upon the right internus, resulting ten days later in a remote and proximal fixation in the normal position without painful effort. I presume it may be best, somewhat later, to correct the displacement in the left eye, making a guarded tenotomy, however; this I should not suggest to the patient unless she complains of further pain.

The method which I adopt in all cases of asthenopia has been strictly followed in the management of these cases. I first attend to the correction of errors of refraction; then after a sufficient time has elapsed the correction of the muscle condition is carefully considered. I prefer the Stevens phorometer for low degrees of heterophoria, using the Maddox rod, and divide prism, etc., as aids in measuring the error and educating the muscles. As to the technique of operations for tenotomy and advancement, I have but little to offer that is new, and nothing purely original.

In the guarded tenotomy which I now make for the relief of very low degrees of heterophoria, I follow the plan suggested by Dr. Stevens or Noyes, also Stevens advancement in errors of low degree, with the exception that I use a broader divulser to separate more thoroughly the numerous bands of attachment between the tendon and the ocular walls, as this latter condition may prevent the lengthening of the muscle and render imperative the tenotomy. To attain the maximum effect of a complete tenotomy without danger of displacing the tendon, and to regulate the position of the future attachment I proceed as follows:

Enter the conjunctiva just above the lower border of the muscle to be receded, separate the capsule and tendon from the conjunctiva, grasp the center of the tendon with the forceps and proceed as in graduated tenotomy; grasp the center of the cut tendon with broad fixation forceps and introduce the needles of a double armed suture; draw them through, transfix the conjunctiva as far back as you wish to displace the tendon, then bring them out through the conjunctiva; now complete the tenotomy, again using the divulser to separate the tendon from ocular walls; the suture is now drawn up and tied, but not too tightly. Should the conjunctiva wound gape, close it with a light suture. This operation secures both maximum effect and proper attachment.

I have found it necessary, preliminary to operating for heterophoria, to make a thorough study of both pose and movements of the patient before measuring the muscle error or in any way embarrassing them. The best plan is to draw their attention to books, curios, people, to distant buildings, meanwhile observing closely and making notes of all interesting deductions, remembering the general rule that, "the head moves in the opposite direction to the projection of the visual lines." A careful chart should be prepared and notes made of every operation and its results, for usually several cuttings must be made before a perfect orthophoric condition in the normal pose can be obtained. I have found it expedient to apprise my patients of this before commencing the operations. As we are able to do all of the surgical work under cocain anesthesia, much of the terror and all of the danger of tenotomy has been removed.

DR. GOULD—I have had two or three cases that somewhat resembled those reported by Dr. Colburn. One patient carried his head back in order to avoid double vision due to heterophoria. By carefully adjusting glasses, his muscles were strengthened so that he held his head in a normal position. One other patient had quite a distortion of his features, his forehead being wrinkled in concentric curves clear from his eye to the roots of his hair. It was very noticeable. After three months he was holding his head straight with the skin of his forehead nearly straightened out. I had still another case somewhat similar to this one.

DR. JACKSON—I that that the class of cases to which Dr. Colburn has called attention is a very important one; and one to which the attention of the profession needs to be more generally directed. I feel like taking exception, however, to his classing them as cases of heterophoria, if I heard some of them correctly. They are rather cases of paralytic squint in which it is impossible to obtain binocular vision in the central portion of the field of vision. I have seen quite a number of these cases; and have also seen the other cases, which could be classed as heterophoria because binocular vision could be obtained in all portions of the field of vision though only with undue effort. When Dr. Stevens gave us the new terms, the "phorias," I hoped that they would be applied only to cases of muscular error which correspond to concomitant squint; and that for these cases of special weakness in one muscle or group of muscles we might still use the very significant term, insufficiencies.

WHEN THE MERCURY WENT DOWN.—The *Chemist and Druggist* offers us the following: Mrs. Mulcahey: "Shure, docther, and is it thrue that little Jimmy O'Toole bit yoore termomety in two and swallowed the mercury?" Doctor: "Yes, my dear madam, it is, and the boy is dead." Mrs. M.: "Shure, docther, an' it were a cold day for Jimmy, poor bye, whin the mercury wint down." Doctor: "Yes, madam, he died *by degrees*."

TWO MORE CASES OF ORBITAL AND OCULAR GROWTHS, WITH SUBSEQUENT HISTORY OF CASES PRESENTED LAST YEAR.

Read in the Section on Ophthalmology at the Forty-fourth Annual Meeting of the American Medical Association.

BY JOSEPH A. WHITE, A.M., M.D.
RICHMOND, VA.

I here present for your consideration two cases of ocular growths which have come under my observation since our last meeting, thinking they might be of interest:

Case 1. Orbital Growth, Fibro-sarcoma (Post-ocular).—Betty Lytle, colored, age 24 of Blackstone, Va., came to me Sept. 27, 1892. In May, 1892, she had consulted her physician, Dr. Harris, about a severe pain across the forehead and through both temples. He could find nothing abnormal about the eyes, except a slight redness of the conjunctiva of the left eye. He treated her for neuralgia, but the pain still persisted and gradually grew worse. He could get no history of syphilis, but thinking the pain might be due to a gumma he put her on iodid of potash, but with no relief. The left eye soon began to show prominence without local signs of inflammation. He then concluded to send her to an oculist and gave her a letter to me. On the way she stopped with friends in Petersburg who advised her to consult a physician there. He advised her to have the eye punctured and the fluid drawn off as he expressed it. She returned to Dr. Harris with this advice, which he did not follow, as he could find no signs of a collection of fluid. He then sent her to me again. I found the eye very prominent, so much so that the lids could hardly be closed, although she could still see fairly well. I attempted to remove the orbital growth and save the eye, but it was so large this was not practicable and I removed eye and tumor, which nearly filled the orbit.

I have had a letter from Dr. Harris the past month saying she was annoyed at times, especially at night, with pain in the orbit, but he could find no signs of recurrence. The woman looked well and was doing her usual work. I sent the growth to Dr. William M. Gray of the Army Medical Museum, who promised me a full report on its nature, as well as a section of the growth for this meeting, but have not received it. He stated, however, that it was a fibro-sarcoma of the orbit.

Case 2. Melanotic Sarcoma of Choroid.—Miss F., of Milton, N. C., a lady of about forty years of age was sent to me Feb. 22, 1893, by Dr Dodson her physician, to have her left eye enucleated, because it was blind, disfigured by a large black spot and was giving her constant pain. I found the eye to be totally disorganized, anterior chamber obliterated, lens cataractous, and a large black patch of the sclerotic about a half inch long and a quarter inch wide above and to the outer side of the cornea. I diagnosed melanoma of the eye and feared it had already penetrated the sclera posteriorly. As the tension was not increased at all and the eye was less painful than it had been it was enucleated Feb. 23, 1893, under cocain. The optic nerve was drawn out and cut as far back as possible. As far as a microscopic observation went, the growth had not penetrated the sclerotic, which was seemingly intact.

I sent the eye to Dr. Gray who reported it to be a melanotic sarcoma originating in the ciliary bodies or choroid, that it was of a mixed variety, composed of large and small, round and spindle cells; that it had infiltrated through the sclerotic, forming small pigmented nodes on its outer surface. He sent slides of this tumor, which you can examine. These two cases will each probably have recurrence of the growth, although it is not certain.

Last year I presented four cases of orbital and ocular growths operated on at the clinic of the Richmond Eye, Ear, Throat and Nose Infirmary, within four months—two by Dr. Dunn and two by myself. I also exhibited very handsome micro-photographs of these growths which were most abominably reproduced in the JOURNAL, giving no idea of the original plates. Two of these were so-called malignant fibroids of the orbit (Cases 2 and 3). One (Case 1) was a melanotic sarcoma of the choroid, similar to the one I have just presented. The fourth one was an orbital sarcoma of the choroid which Dr. Gray called a tuberculous growth, because of the peculiar microscopic appearances resembling tubercle more than anything else. Thinking the further history of them might be of some interest, I have taken the liberty of appending it to the above report. Case 1 (melanotic sarcoma of the choroid), has had no recurrence in the orbit. I wrote recently inquiring about his condition and was informed that he was ill with some obscure liver trouble, but that his eye was pretty much as when I saw him last. From this information I concluded he was suffering from a metastatic malignant growth of the liver.

About eighteen years ago I had a similar experience. I enucleated a large growth of the orbit (the eye had been previously removed) which on examination proved to be a melanotic sarcoma. It was half as big as my fist and projected considerably beyond the orbit. It was so firmly attached to the orbital walls that I had great difficulty in freeing it from its attachments, and was compelled to remove almost entirely the superior orbital plate. I applied Vienna paste to the remainder of the orbit, and the man made a rapid recovery. I expected a speedy recurrence, but during the three years he lived there was no return of the growth. A postmortem, however, showed that his death was due to a malignant growth of the liver, exemplifying the metastatic nature of these growths.

Further history of the case of malignant fibroid of the orbit (Case 2 reported last year). Patient reappeared at the clinic July 25, 1893. Tumor had grown again. It had chosen as points of origin all the areas of the bone from which the periostdum had been stripped in the former endeavor to eradicate the growth. This was found out during the operation for the removal of the growth. The bleeding was excessive. The tumor was found to have passed backwards into the sphenoid fossa and had sent its prolongations through the ethmoid plate. Negro returned to the clinic only two or three times to have the wound dressed. Reappeared Dec. 5, 1893. Tumor was quiet for three months, when it began to grow again. It now became a huge fungus which protruded from the orbit, infiltrating the adjacent skin. Attempt was made to clean out the orbit as far as possible, but operation was unsatisfactory and bleeding was excessive. Operation did not check the growth of the tumor, which had gone into the antrum, nasal cavities, etc. Patient died of exhaustion in February when the tumor had attained a size almost beyond belief.

Further history of case of tuberculosis of orbit (Case 4 reported last year). Appearance of a growth between the eye and the upper part of the orbit in the autumn of 1892. As it gave the patient little inconvenience no operation was done until March, 1893, when attempt was again made to remove the tumor without enucleation of the eye. Operation apparently successful. No return up to May 21, 1893. Microscopic examination of tumor removed showed it to be a small-celled sarcoma which had infiltrated the lachrymal gland. Tumor will probably return.

This second examination was made by another

pathologist who did not find the peculiar tuberculous appearances, "the nests," described by Dr. Gray when he examined the growth. Case 3 was one of fibroma of the orbit and I expected it to recur and speedily, too, because fibromas of the orbit while not regarded as malignant in structure, are practically so from their tendency to recurrence and because, apparently, I had not succeeded in totally enucleating the growth, but rather to have amputated it at the sphenoidal fissure through which it seemed to pass. Up to one month ago, however, nearly eighteen months after the operation she has shown no signs of recurrence. What the future may develop I can not say, but trust I may be mistaken in my unfavorable prognosis.

NOTES ON BIFOCAL SPECTACLES IN APHAKIA.

Read in the Section on Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY H. V. WÜRDEMANN, M.D.
MILWAUKEE, WIS.

The satisfaction expressed with bifocal glasses by hyperopes, whose presbyopia necessitated stronger convex lenses for reading, led me about a year and a half ago to advise this form of spectacles for aphakic patients. The conclusion reached seemed so natural to my mind that I believed, until I examined the literature of the subject, that the same idea must have occurred to many of my colleagues, and that such glasses must have been used for cataract patients, practically since the introduction of the cement bifocal. Due and strict search having been made nothing was found in the literature, and but little new was gathered from the manufacturing opticians concerning the trial of such glasses by other ophthalmists.

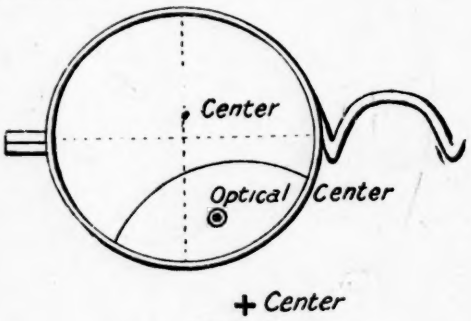

FIGURE 1.

The most appropriate form seems to be that in which the refractive value is made greater by cementing a semilunar shell to the lower part of the larger lens. On account of the thickness of the strong convex lens (from 8D. to 12D.) the "split or Franklin bifocal" is not applicable. The cost of grinding the reading on top of the distance lens militates against the combination being made in one piece. The cement bifocal is comparatively cheap and has given satisfaction. It has been found advantageous to modify the ordinary form by making the spectacle eye of a high oval, nearly round, as this gives a larger field for distant vision; also to make the reading shell small and placed diagonally a little to the nasal side, as was advocated some years ago by Klein in his form of bifocal lens. (See Fig. 1.)

This gives a better field for near vision and likewise diminishes the prismatic effect of the larger lens. There is an average difference between the visual lines for the near and far distance of 2 mm., which amount of decentering in a 10 D. lens would make an effect equal to Pr. 1.25 D., an amount of artificial exophoria which may prove troublesome. In some instances I have found it advantageous to decenter the larger lenses upwards 1 to 2 mm., varying with the case, as the unpleasant upward projection of the ground is thereby relieved. It is advisable to place the strongest convex surface away from the eye in all instances, and to grind the cylinder on the posterior aspect of the glass, as has been advocated by Gould.

When the formula is for simple convex lenses only, the lens may be made concavo-convex, and the reading shell is best cemented on the posterior surface of the larger lens; but when a cylinder is involved on account of the difficulty in grinding it on so thin a shell, it must be placed in front. In compound formulas the periscopic form is out of the question and the cylinder should be ground on the plane side of a plano-convex lens. Nearly all eyes, aphakic ex operatione, are sufficiently astigmatic to warrant the cylindrical correction, and thus it is but rarely that we may give our patients the periscopic form of lens.

The advantages of bifocals in aphakia are those which presby-hyperopic patients acquire by the use of one pair of glasses for all vision. They may be properly given to nine out of ten cataract patients whose resulting vision after operation allows them to read ordinary print with their correction.

805 Grand Avenue.

DR. MURRELL—I have been using bifocal lenses after cataract extraction for a number of years. I have several patients wearing them now. My next door neighbor has worn a pair for several years; has good vision and can read fine print all day long. I advise the use of them.

DR. ZIEGLER—I have been ordering these bifocal cataract lenses for several years; in fact ever since bifocals came into general use. They are undoubtedly the most convenient lens for aphakic eyes. Even where only one eye has been operated upon, bifocals are superior to the more clumsy "reversibles." I think Dr. Würdemann has overlooked the very important "toric" or "ellipse" lens, which was presented before the American Ophthalmological Society by Dr. Harlan in 1885, and subsequently discussed in a paper by Dr. Green. This is especially advantageous where we have a cylinder in combination with very high sphericals. It is composed of two cylinders ground on the same side of the lens, and at right angles to each other. As one cylinder is stronger than the other we secure the effect of a sphero-cylinder; the balance of the spherical is then ground on the other lenticular surface. We thus practically divide the spherical on each surface of the lens, and then grind the cylinder on one of these spherical surfaces. This makes a much thinner lens than the old form, where the cylinder alone is on one side and the large spherical bulge is on the other. But aside from being a thin lens, its chief advantage lies in the fact that it furnishes a greater clearness of visual field, which will be promptly appreciated by the patient. This lens may also be ground periscopic. The bifocal slip can easily be added to either form.

Where the two eyes have been operated upon, I have sometimes prescribed a distance correction for one eye, and a reading correction for the other. This arrangement is particularly applicable in those cases where

there is considerable muscular insufficiency. It allows one eye to enjoy clear vision for distance, and the other clear vision for reading. I ordered such an adjustment recently for a physician whose left eye I had operated upon for zonular cataract, while the right one still retained good peripheral reading vision. As there was considerable muscular deviation in the vertical, a prism was added to the glass. He was ordered H. O. D. S. ÷ 2D. for reading; O. S. S. ÷ 9 D. P. ⌒ 4° base down, for distance.

It may be well to bear in mind the fact, that discomfort from the use of cataract lenses may be entirely due to muscular deviations, and we should order the proper prismatic correction wherever needed.

PERNICIOUS HYPERTROPHIC CONJUNCTIVITIS AND ITS TREATMENT.

Read in the Section of Ophthalmology, at the Forty-fourth Annual Meeting of the American Medical Association.

BY CORNELIUS WILLIAMS, M.D.

ST. PAUL, MINN.

I shall not occupy the time of this section by a definition of the pathology of this affection. Under the generic name of trachoma, the disease is well known to all of you. Since, however, a name should be definitive of as many pathological features of an affection as may well be, to my mind the name which I have chosen is more appropriate than any that I have seen applied to this morbid condition.

Pernicious hypertrophic conjunctivitis, as usually presenting itself to the surgeon, is chronic and complicated. The disease will have involved the cornea and there may be, or have been iritic implication, as even the deeper tissues of the eye do not escape. In a case which I had an opportunity of intimately observing, I was able to fix the time of incubation at five days from the time of inoculation to the time of declaration of the disease, though I can well understand that the term may vary. The emphasis of the primary declaration, I fancy, will depend very much more upon the quality of the seed implanted in that particular case, than upon any peculiarity of the culture medium. I have seen cases in which the entire conjunctiva had increased more than twenty-fold in thickness, in as many days, and others in which the hypertrophy was not considerable, even though the disease had existed many months.

The invasion of the cornea does not always take place through an abrasion of the epithelium, but may, I believe, be accomplished through the lymph channels. When once the cornea becomes affected, the ciliary spasm brings a largely increased blood supply to the conjunctiva, and the vicious circle is established. The later phases of the disease are of great interest. The form of degeneration marked by the development of trachoma bodies may be absent entirely in some cases and abundantly present in others. Those cases that have been the subjects of irregular and severe treatment of different kinds are rather more apt to present that peculiar manifestation, conjoined with atrophic spots, while such as have not been treated at all, save by simply cleansing, although long in existence are on the whole better off than those in which the treatment has been harsh.

That the disease, as we now find it, ever originates in any other way than by direct contagion, I think few will maintain. That there are a great number who, in all probability, receive the contagium on the conjunctival surface, and escape the development of the disease, is due to the fact that an actual lesion of continuity is necessary to infection. I have seen cases that make me believe that pernicious hypertrophic endo-rhinitis may result from the conjunctival affection, by auto-inoculation. In the case of a Russian girl of 6, the turbinated bones had undergone complete atrophy from this cause. It is the exceptional case in which an eye is lost through this disease, though many are damaged beyond repair.

The disease is very frequently confined to one eye, or may affect the second eye only in a limited degree. It is not unusual to see a virulent type of this inflammation in one eye, while the other member presents the appearance of slight hypertrophic changes; but little secretion with absence of corneal invasion. With appropriate excitation, however, the morbid process in the seemingly favored eye will kindle and attain a dangerous exaltation; all within a very few days. Once this pernicious hypertrophy has actively involved the entire conjunctiva, it never again recedes to its former line of behavior.

This affection may last an average lifetime. It is curable, but at an expense of a certain loss of the conjunctival substance, the degree of loss in direct proportion to the hypertrophy. It goes without saying that in addition to the tissue loss, as the result of the disease, injury inflicted by way of treatment is responsible for much of the deformity of the tarsal envelopes, and consequent damage to the eye so frequently seen.

Treatment.—There is no disease of the eye so often ill treated as pernicious conjunctivitis. In the primary affection, ice should be used with much caution. While a valuable remedy, it may actually aggravate the affection by inducing a vasomotor paralysis of the conjunctival vessels. Ice cloths should be thin—bits of absorbent cotton are better—and should not be used longer than an hour at a time, with an interval of an hour. Mild astringents should be used from the very first. Nitrate of silver, 1–5000, or bichlorid of mercury, 1–20000 or 40000; the conjunctival sac should be very gently and thoroughly flooded with one of these solutions, alternating with a warm solution of boric acid, ten or twelve times a day, or oftener; how often must be left to the discretion of the surgeon. Of one thing, however, he can be assured, i. e., in very many, if not in all cases, any application followed by reaction apparent to the eye of the surgeon, will be resented by the eye of the patient. This reaction is the surgeon's guide. He may use the astringent applications as strong and as often as the eye will bear, without apparent reaction. If he transgress this rule he will lose ground. I have used the bichlorid solution 1–400, with only a little smarting and increase of redness, lasting for five minutes, while on the other hand, a 1–3000 solution, is sometimes highly irritating. An application which causes pain for longer than five minutes, while it may do good is almost sure to do harm. This, I believe to hold good for any stage of the disease but it is, of course, less true in the later stages. It may be well to bear in mind that the condition of great hypertrophy is a condition of great tolerance and insensibility which, however, may only last a few days after active treatment begins.

The hypertrophy will begin to diminish, and does diminish, *pari passu*, with the diminution of the

secretion. The retrograde metamorphosis is marked by lessened secretion. Whatever the treatment adopted, I have never observed lessening of the hypertrophy until the secretion had very much diminished. I am convinced that, in any stage of the disease, the frequent application in the course of the day of a solution of sulphate of copper, or the mercury bichlorid 1–30000 or 1–50000, will accomplish more than can be attained by a single application of either remedy of sufficient strength to produce visible reaction. In fact, that the successful treatment of pernicious conjunctivitis, whatever the agent employed, must depend upon the frequent use of that agent, and in such strength only, that no apparent reaction shall occur. When trachoma bodies appear, the application of jequirity, or better, the expression process, certainly much hastens the matter of involution, but it is questionable if the conjunctival surface will have been left in so good a condition after either jequirity or expression, as it would have been had the method of very frequent treatment with the bichlorid, or some similar acting drug, been adopted. Now, as to the choice of the medicament, I think mercury bichlorid perhaps the best, but I doubt not that there are many substances which might be successfully used instead, just as in urethritis, which this disease so much resembles, there are many remedies. Many surgeons are agreed that the most proper way of treating the urethral disease is by means of mild and frequent medication.

It would seem like a work of supererogation to thus dwell upon the minutiæ of treatment before this section, but my personal experience, costly enough, has taught me that able surgeons in high places do not always address themselves with that conscience to the treatment of this affection that its importance demands, and which the patient has a right to expect from his physician. Atropin is absolutely indispensable as an adjunct in the treatment of pernicious conjunctivitis. It should be used early, even before any implication of the cornea has declared itself, for by allaying ciliary spasm the first part of the process of the vicious circle establishment is rendered impossible. It ought to be incredible that the imperative indication for the use of a mydriatic could be overlooked by the surgeon in the treatment of the disease in question, yet I, myself, am the possessor of a ruined eye, and due to this very oversight on the part of a surgeon generally as competent as any in the country.

The detail of the toilet of the eye, after whatever application, is of importance. In treating the eye, instead of a camel's hair pencil or a dropper, I use a small probe, so wound about the end with absorbent cotton that an expanded portion projects. This is dipped in the solution to be used and the turned lid is flooded with the solution which readily flows from it. The lower cul-de-sac is similarly treated, after which the ciliary margins are gently freed from every adhering bit of secretion and then carefully dried. If this is not done, the edges of the lids are constantly itching and it requires unusual control on the part of the patient to avoid rubbing the eye, and consequent aggravation of the disease process.

When I first saw pernicious conjunctival disease treated, it was done entirely with sulphate of copper in solid form, and I speak of that method of treatment here to condemn it as brutal, painful, unskillful and unsuccessful. I have seen children with hypertrophic conjunctiva, with and without trachoma, actually become men and women, the while constantly treated with blue stone, and after seven years they were no better than at the beginning. Surely this is an opprobrium and should suffice to damn that method of treating the disease. I wish particularly to condemn any irritating application, and especially peroxid of hydrogen, in the acute corneal ulcers of pernicious conjunctivitis. I well remember the pain which the peroxid produced in my own eye, and from the use of which started an iritis that, untreated, resulted in complete closure of the pupil with its inevitable consequences, and it is only by such malpractice that an eye can be lost in this affection.

It is needless to say that abstinence from use of the eyes is of prime importance. The disease, difficult enough to cure at best, is aggravated by every considerable effort of accommodation and convergence.

CORRESPONDENCE.

Diphtheria at St. Paul.

MINNESOTA STATE BOARD OF HEALTH AND VITAL STATISTICS.
OFFICE OF THE SECRETARY AND EXECUTIVE OFFICER,
RED WING, Oct. 19, 1893.

To the Editor:—The following is the reply of the Commissioner of Health to your inquiry:

"In reply, I would state that there was very little in connection with the whole matter. A number of families having children at the Neill School wished to get them transferred to other schools—the Neill School, as I understand it, being rather overcrowded, and to get a good excuse for so doing, got up this diphtheria scare. The records show three cases of diphtheria as having occurred within the radius of the Neill School within a period of nearly a month, which is very much unlike the statements made by the people in that vicinity, both publicly and privately. I refused to close the school, but Supt. Gilbert, under the pressure that was brought to bear upon him by these people, ordered the school to be closed over Friday, Saturday and Sunday, if I remember right, on his own responsibility and during that time had it disinfected, etc. That is all there was to it. You know the value of newspaper reports, and I am glad you propose to verify by reference to headquarters of each State. Yours, C. N. HEWITT,

Secretary.

Ethics Again—The Milk in the Cocoa Nut.

RICHMOND, VA., Oct. 21, 1893.

To the Editor:—At the annual meeting of the Medical Society of this State, held at Charlotteville October 3, the resolution offered by Dr. Upshur of Richmond, affirming our loyalty to the present code of ethics, was passed with only two dissenting votes—the move to "lay on the table" and his second, Dr. Hunter McGuire, made a strong speech in favor of the resolution, affirming that the medical men in New York who desired to "let down the bars" were influenced solely by the selfish purpose of getting consultation fees from homeopaths. Very respectfully,

W. W. PARKER.

Blank applications for membership in the ASSOCIATION, at the JOURNAL Office.

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All members of the Association should send their Annual Dues to the Treasurer, RICHARD J. DUNGLISON, M.D., Lock Box 1274, Philadelphia, Pa.

SATURDAY, OCTOBER 28, 1893.

TURKISH BATH IN MEDICINE.

The Turkish bath as a therapeutic agent is coming into greater prominence every year, especially in asylums and sanitariums. Private baths in cities are in many instances largely supported by patients sent from physicians. In Europe many of the large hospitals and all the sanitariums are equipped with these baths, as essentials in the treatment of disease. The thirtieth anniversary of the first public bath opened in this country, at Brooklyn, N. Y., was celebrated last week by DR. C. H. SHEPARD, the founder. In an after-dinner address on this occasion, DR. SHEPARD reviewed the early history of the baths in the Roman empire. Three thousand years ago the Greeks used the hot water and hot air bath, which was the same as our Turkish baths. Its use was originally a religious rite to prevent evil spirits from taking up their abode in the body. In Roman civilization it attained a perfection that seems wonderful even to-day. The largest bath ever constructed was by DIOCLETIAN, and could accommodate eighteen thousand bathers at one time and was over a mile in circumference. The Pantheon of Rome, now used as a church, was built as a vestibule to the baths of AGRIPPA. At one time there were nine hundred baths in Rome, and every person was obliged by custom and law to use them every week or oftener. At Alexandria in the seventh century, the number of baths reached over four thousand. It is a curious fact only recently recognized, that during these ages when the baths were so common and popular, no epidemic diseases prevailed. Rome, Alexandria and Constantinople, and also the earlier Grecian cities, were singularly free from plagues and contagious diseases during these times. As soon as these nacions were overrun by barbarians, baths were abandoned, and plagues and epidemic diseases began. These baths were lost to civilization, except in a small way at Constantinople, until 1840, when the first bath was opened in England. It is said, however, that the bath at Buda-Pest has remained in operation from the date of its original construction by the Romans. Now there are about five hundred baths in Great Britain and about one hundred in this country. Starting at first as luxuries, they have grown to be therapeutic measures of great and increasing value. In this address DR. SHEPARD reviewed the opinions of eminent physicians in Europe, of the nature and value of the bath, pointed out the possibilities of its influence on disease in the future, and concluded that no present remedial measures gave greater promise in the treatment of disease.

In this day of anniversaries it is pleasant to note this event, and to realize that the bath, which has occupied so prominent a place in the highest civilizations of the world and which is so closely allied to sanitary science, is coming into prominence again. To DR. SHEPARD the founder (and member of our ASSOCIATION), is due great credit for establishing the first bath, and so persistently urging its merits and claims on the medical public.

THE FIRST POSTMORTEM RECORDED IN THIS COUNTRY.

The centennial of the Connecticut Medical Society last year, was marked by several historical addresses concerning medical matters a century ago. Old papers and records, physicians' account books and diaries, and old letters and legends, were all examined, and many very interesting stories have been gleaned from them. One of these old records, dated March 11, 1662, makes note of a vote in the General Court of Connecticut, granting unto MR. ROSSITER twenty pounds for opening the belly of KELLEY'S child, and his pains to visit the deputy governor, MAJOR MASON, and MR. TALCOT, and other ministrations. It appears from the long and minutely written account, that JOHN KELLEY of Hartford, had a daughter eight years old, who was taken ill of some form of bronchial pneumonia attended with delirium March 23, 1661, and died five days later. During this illness she complained that GOODY AYRES, who was a general neighborhood nurse, was choking her, and kneeling on her belly, also pinching her. She urged that her father should chop off the head of this nurse who was not called to take care of her. After short periods of sleep she would start up and cry out against this woman. This delirium of persecution continued until death, in which she constantly asserted that GOODY AYRES was the cause of all her pains and torments. The case was considered so unnatural and untimely that a jury of six persons were called to make an inquest.

GOODY AYRES was requested to come up and handle the body in the presence of others. Among other

signs was a reddish spot on the cheek nearest to GOODY AYRES, and certain purging from the mouth, with stiffness of the arms, and black spots over the body, were regarded as suspicious. Accordingly MR. ROSSITER, who lived in Guilford twenty miles away, was sent for to examine the body. Several days later he arrived, and with the assistance of the school master, WILLIAM PITKIN, made the necropsy. The following is the record made in the handwriting of MR. ROSSITER. He condensed his account into six particulars which he said in his judgment were preternatural:

1. The whole body, the muscular parts, nerves and joints were all pliable, without any stiffness or contraction, the gullet only excepted. Experience of dead bodies renders such symptoms unusual.

2. From the costal ribs to the bottom of the belly in the whole latitude of the womb, both the scarf skin and the whole skin with the enveloping or covering flesh had a deep blue tincture, when the inward part thereof was fresh, and the bowels under it in true order, without any discoverable pecaney to cause such an effort or symptom.

3. No quantity or appearance of blood was in either venter or cavity as belly or breast, but in the throat only at the very swallow where was a large quantity as that part could well contain, both fresh and fluid, no way congealed or clodded as it comes from a vein opened, that I stroked it out with my finger as water.

4. There was the appearance of pure fresh blood in the backside of the arm, affecting the skin as blood itself, without bruising or congealing.

5. The bladder of gall was all broken and curded, without any tincture in the adjacent parts.

6. The gullet or swallow was contracted like a hard fish bone that hardly a large pease could be forced through.

This was signed by DR. ROSSITER and was evidently intended to convey the idea of death from preternatural causes. MR. PITKIN, the school master, followed with sundry observations on the symptoms of the case, and the incidents attending the death and body when laid out. This was sworn to and attested by MR. CLARK, Secretary of the colony. Nothing further was done, and GOODY AYRES moved away and the claim or suspicion of bewitching was forgotten. In 1663 this same surgeon performed another autopsy on REV. SAMUEL STONE, who died suddenly. The only thing mentioned was that this man had no gall bladder. In 1659 a new disease appeared of "bladders in the windpipe" which seems to have been very fatal among children. Some examinations revealed this state about this time. A curious record of the examination of animals to find the cause of death, is noted in the records of New Haven as early as July, 1650. In a lawsuit over an ox, in which it was claimed that he was killed by overwork, one EDWIN PARKER examined the body and testified to its appearance. The record states that the heart was full of blood, and the liver and lungs were swelled and the flesh was waterish.

This KELLEY case was the first necropsy that was recorded fully, and the surgeon, ROSSITER, was probably the most eminent man of his time. It is found from some old records that he received his education in England, and appeared in 1631 in the Massachusetts colony. He was an intense loyalist and did not get along very well, but finally he came to Connecticut and lived and died much respected for his medical ability.

The centennial volume of the State medical transactions of Connecticut contains many very interesting records of physicians and medical practice in the seventeenth and eighteenth centuries, and is among the first to gather and group this history in a permanent form.

LOUISIANA QUARANTINE.

The models of the Louisiana quarantine plant on exhibition in the Hygienic Department at the World's Fair are among the most interesting. The present quarantine system of the State of Louisiana is based upon that inaugurated by DR. JOSEPH HOLT in 1885, and consists of a complete plant for the fumigation and disinfection of vessels, together with the cargo and effects of ship, crew and passengers.

The apparatus for fumigation consists of a furnace for generating sulphur dioxid, from which the gas is forced through a pipe leading to the bottom of the vessel. The air used in the combustion of the sulphur in the process of oxidation is drawn from the ship's hold through a pipe whose extremity reaches just below the hatchway, thus drawing through the furnace and rendering innocuous the foul air of the vessel. In addition to this apparatus, which is on the steam tug, there is a like supplementary apparatus fixed on a movable car on the wharf. The disinfecting apparatus consists of two processes, that by steam and that by a solution of mercuric chlorid. While a vessel is undergoing fumigation, either in mid-stream by the tug or alongside the wharf, all textile fabrics and baggage are disinfected by being placed in the heating cylinders. These cylinders are eight feet in diameter and sixty feet long, and are three in number, thus providing ample accommodation for the disinfection of the largest steamship. After the goods have been opened they are suspended on racks which are run into the cylinders, the heads of which are then closed and steam injected until the thermometer indicates a temperature of 220 degrees Fahrenheit, which is held for one-half hour, when the effects are removed.

For the disinfection of furs, leather and rubber fabrics which would be destroyed by the heat, the mercuric solution is used, by means of hose with a spray nozzle which saturates them effectively.

The present cylinders in use were the result of long and careful experimentation by DR. C. P.

WILKINSON, and differ materially from the original wooden chamber erected by DR. HOLT.

The furnace for generating the sulphur dioxid now used, is an improvement made upon the original by DR. S. R. OLLIPHANT, and enables the production of a larger quantity of gas of greater proportionate strength than formerly. While the system is the same as that adopted upon the original ideas of DR. HOLT, the present plant with its improvements is far more effective and gives a greater guarantee of safety.

Having had principally to deal with vessels from yellow fever infected ports, it is believed that the efficacy of the Louisiana system of quarantine has been fully demonstrated by its results, inasmuch as no case of yellow fever has occurred upon a vessel after disinfection (although many have been previously infected) and by the absence of the disease from New Orleans, a city which previous to 1879 was perennially infected with yellow fever.

The establishment by DR. HOLT of the present system inaugurated a new era in maritime sanitation. Prior to this time detention, and an attempt at disinfection and purification without isolation was the rule; now detention is only required to as limited a period as is consistent with safety, careful inspection and thorough disinfection, purification and isolation. The Marine Hospital Service immediately adopted the same plan with slight modifications; in fact all the maritime quarantines are practically carried on in like manner, and our coast defenses against the introduction of foreign pestilence are in excellent condition.

A MODEL HEALTH PUBLICATION.

For many years we have been in receipt of many sanitary publications, all of which are useful, many of them admirable, and some of them models; among the latter those of the Minnesota Board are fairly classed.

The mortality report for instance, is based upon a careful personal review of all causes of death reported to the Secretary's office for the month to which it is is referred, and is collected to represent the actual population accounted for, and every fact, including individual causes of death, is carefully revised before publication.

The Minnesota system of obligatory notification of infectious disease, and the monthly report of causes of death with obligatory notification of all deaths and their causes by medical men, is supplemented by an arrangement the Secretary, DR. C. N. HEWITT, has with Town Clerks and Health Officers to give the name and address of every physician in attendance upon a case of disease at death.

This system is the outgrowth of six years of assiduous effort, the intention being to make this information available every month to Health Officers and physicians. On page 66 of "Public Health" will be found in the "mortality record for August," one method of using this information.

We reprint the September summary in the Miscellany pages of the JOURNAL in this issue.

RIGHT TO ESTABLISH HOSPITALS.

An urban sanitary authority has recently purchased a building which it is proposed to convert into a hospital for infectious diseases, writes a subscriber to an English law journal of October 7. The building is not situate within the authority's own district, but in that of an adjoining authority. The property owners in the neighborhood feel that their property will be seriously injured by the situation of the hospital, owing to a reasonable apprehension of risk, and interference with the pleasurable enjoyment of their houses for ordinary purposes. Now what can be done about it? is the question asked in conclusion. The sanitary authority of the district can not, as such, prevent the use of the building as a hospital, it is answered. If the hospital can not be used without causing a public nuisance, the sanitary authority, or any owner of property, may maintain an action in the name of the Attorney-General for an injunction to restrain its use. But such an action, brought in advance, it is said, has been rarely successful. Of course if the hospital when opened is found to be a nuisance, any owner who is aggrieved may bring an action, and will undoubtedly obtain relief. A number of decisions are cited in support of these statements, and much the same principles will be found to be true and applicable in this country.

ARMY MEDICAL EXAMINING BOARD.

The Army Medical Examining Board recently convened in Washington, D. C., for the examination of candidates for admission into the Medical Corps of the Army has concluded its labors, with the result of adding five young officers to the Corps. We learn that about forty candidates received invitation to appear before the Board but that only thirty-four took advantage of the permission. Of ten examined during the first week one was successful; of fourteen who appeared during the second week none succeeded in effecting an entrance, while four of eleven in the third week were more fortunate in the effort to demonstrate their qualifications. A notable percentage failed on account of defects of physique; and among these were probably some who might have showed to advantage had they been permitted to proceed with the examination into their general education and professional acquirements. We print in another part of this issue, copies of some of the sets of questions used by the Board in the written examinations.

THE NEW CURE FOR TUBERCULOSIS.

Cures for consumption multiply as thick as the leaves in Vallambrosa, but the victims die as usual. The latest contribution to consumption cures is announced in a dispatch from Berlin to the effect that one DOCTOR J. SUMMERBRODT is now curing tuberculosis by the administration of creosote. It is well known that creosote is an anti-bacillary agent of high power, but we are sure that Americans will do well to await further particulars before going wild over this new-old discovery. The memory of the Bergeron method, the stupendous failure of tuberculin, and the history of the myriad other failures, each heralded in its day as an unfailing remedy for the scourge, will operate to cause a suspension of judgment until results shall have finished the demonstration.

THYROID GLANDS.

Owing to the interest that has lately been shown in the use of thyroid glands in the treatment of myoxœdema, etc., and to afford physicians an opportunity of determining the value of this agent, Messrs. Armour & Co. of Chicago, offer to supply gratis a small quantity of "Desiccated Thyroid Glands" to members of the profession, upon application, for experimental purposes. The facilities of this firm for preparing the article are certainly unequalled, and the opportunity seems to us one which is worthy of attention, and which should be taken advantage of in the interests of medical science.

MR. GEO. KEIL of Philadelphia is in Chicago this week, representing the S. D. Gross Monument Fund, and will call on the leading members of the profession in this city. Twelve thousand dollars is the minimum amount required, and the raising of the amount should not be doubtful.

Gentlemen desiring to anticipate MR. KEIL'S visit may leave contributions for him at the JOURNAL office, if more convenient.

ASSOCIATION NEWS.

Time of Meeting.

OCTOBER 16, 1893.

To the Editor:—The next annual meeting of the Medical Society of the State of Washington was set for the first Tuesday in May, 1894, and I understand that the AMERICAN MEDICAL ASSOCIATION meeting is set for the same date. I see that a change in the latter is contemplated. Please let me know at the earliest date the time of the AMERICAN MEDICAL ASSOCIATION meeting at San Francisco, and we will arrange our meeting accordingly.

Very truly, R. L. THOMSON, Sec'y.

ANSWER.—In order to enable State medical societies to send instructed delegates to the next meeting, prepared to vote on the proposed new constitution and amendments, a change of the date of the meeting has been proposed by a few members of the Business Committee. A change in the time of meeting can only be authorized by the President, who has not yet issued the call.

The Journal of the American Medical Association takes as much interest in pharmaceutical affairs as any medical exchange we receive. No doubt the editor recognizes the close relationship which exists between the two professions. —*Meyer Brothers' Druggist*, October, 1893.

SOCIETY NEWS.

New York State Medical Association.

Tenth Annual Meeting.—Held in New York, Oct. 9, 10, 11 and 12, 1893.

S. B. WYLIE MCLEOD, M. D., PRESIDENT.

INTRODUCTORY SESSION—MONDAY EVENING—OCTOBER 9.

The President in his Address referred to the many important contributions that had been made by members during the past ten years, and the share each department had taken. He said that although the Association was organized on Feb. 4, 1884, it has at present eight hundred members, and a library of over nine thousand volumes.

DR. JOHN SHRADY of New York County, then delivered an address on

THE MEDICAL WORK OF THE ASSOCIATION DURING ITS FIRST DECADE.

He referred to many of the more important papers and discussions, such as, Dr. Gouley's address on "The Nosology of Disease"; Dr. Janeway's address on "Pathology"; Dr. A. Flint, Jr.'s paper on "Some of the Relations of Physiology to the Practice of Medicine"; Dr. Van Zandt's paper on "Commercial Prescriptions"; Dr. McEwen's description of "The Mineral Waters of Saratoga"; Dr. Leale's article on "Nasal Feeding after Intubation", and many others. A prominent feature of the work of the past few years is the practice, adopted from the British Medical Association, of having prepared discussions. The first of these, which was proposed by Dr. Flint, was on pneumonia. They had proved very profitable.

MORNING SESSION—FIRST DAY—TUESDAY—OCTOBER 10.

DR. JAMES G. PORTEOUS of Dutchess County read a paper on the

PREVENTION OF DISEASE

in which he referred particularly to the many ways in which tuberculosis was spread abroad. Milk is an important factor in carrying infection of various kinds. What wonder that the medical profession is urging that dairies should be under strict medical supervision when those engaged in milking the cows are seen to dip their fingers into the pail of milk and wash off the udder of the cow, and by this repeated dipping of their fingers into the milk, remove both filth and disease from the cow and from their own hands, and deposit in the milk? In order to spread a practical knowledge of the dangers of tuberculosis, and the means of limiting its dissemination, the author is in the habit of distributing to his consumptive patients a printed card containing directions for their guidance, and also a reminder to the well persons with whom they are brought in contact. He advises them to collect all sputa in a wide-mouthed bottle, which is frequently washed out with hot water. They are cautioned against spitting around promiscuously, and against kissing people, and they are urged to have separate table utensils, bed linen, table linen and beds. Their friends are reminded that consumption is an infectious disease, communicated principally by swallowing the germs, by inhaling them, or by having them gain access to the system through wounds. They are also advised not to kiss *any one* on the lips who has a cough.

DR. E. D. FERGUSON of Rensselaer County, read the next paper entitled,

AN ADDITIONAL NOTE ON NEPHROTOMY AND NEPHRECTOMY.

He reported four cases illustrating the difficulties of diagnosis and treatment in this department of surgery, and called attention to the fact that in nine operations on such patients he had not found any evidence of tuberculosis being the cause of the trouble. He thought the drainage

tube of rubber which he formerly employed caused undue irritation, and therefore preferred to use now a free incision and packing so as to retain an open sinus for a long time.

Dr. John Cronyn of Erie County, cited a case illustrating the difficulty of diagnosis, and expressed the hope that in the future the cystoscope would render valuable aid in determining the true condition of both kidneys.

Dr. Thomas D. Strong suggested that by supra-pubic cystotomy one could ascertain by inspection the condition of the ureters, and at the same time treat the disease of the bladder.

Dr. Ferguson said that as anything which is likely to aggravate the existing cystitis is liable to propagate the disease still further, he was opposed to the use of the cystoscope or to ureteral catheterization. He would prefer to do an exploratory operation.

Dr. John W. S. Gouley of New York County, took the same position. An exploratory operation has the advantage that if it confirms the diagnosis, a nephrotomy may be at once performed.

Dr. Nelson J. North of Kings County, then read a paper in which he advocated the topical application of concentrated lactic acid to epitheliomata and cancroid ulcers. This acid is not a caustic, but nevertheless seems to destroy the vitality of abnormal cells.

Afternoon Session.

Dr. N. P. Dandridge of Cincinnati, read a paper on

the surgical treatment of pulmonary cavities.

Such treatment he considered applicable to cases of abscess of the lung, gangrene, hydatid cyst, and to tubercular and bronchiectatic cavities. Such operations are not uncommonly done under the supposition that the case is one of localized empyema. The cavity having been located by an aspirating needle, this needle serves as a guide for the knife. After incision the cavity is best treated by packing it with iodoform gauze.

Discussion on Lesions of the Pleura.

Dr. John Shrady of New York County, opened the discussion, propounding the following questions:

Question 1.—What are the factors of pleurisy? Its forms and contributive conditions? What are the pathological changes in a case of progressive pleurisy ending in recovery?

Question 2.—What are the points of differential diagnosis in pleurisy and other affections of the chest?

Question 3.—What is the treatment of empyema, with relative value of respiration, rib resection and free opening with tube drainage?

Dr. Shrady said that the key to the diagnosis was usually furnished by the shifting line of dullness in the upper part of the cavity. The indications for treatment are, to limit the exudation at the beginning, allay pain, keep the bowels free, and promote absorption. When there is enough effusion of serum to produce intermittent orthopnea, or when the chest is half ful', or when after a month there is no sign of absorption taking place, it is time to resort to the aspirator. Aspiration is best done in the sixth intercostal space on the axillary line. In cases of empyema if there is not sufficient space between the ribs for proper drainage, a portion of the rib may be resected, and a drainage tube without lateral fenestra inserted, and sutured to the skin.

Dr. William McCollom of Kings County, in replying to the first question, said that pleuritic adhesions are found in about 50 per cent. of the subjects examined postmortem. He attributed much importance to the microbic theory of the origin of pleurisy, and explained the apparently contradictory results of various observers by the different stages of the disease at which their investigations were made.

Dr. J. Blake White of New York County, replied to the second question. He said that the pain of pleurisy is sometimes referred to the abdomen, and may therefore prove misleading. Cough, pain in the side and dyspnea, in the order named are developed in cases of tubercular pleurisy, but in other pleurisies the pain and dyspnea usually precede the cough. When the patient shows a tendency to clear the throat frequently, and there is nothing wrong with the throat, it is safe to conclude that this symptom is indicative of pleuritic adhesions. He did not believe that microbes had anything to do with the etiology of pleurisy.

Dr. J. G. Truax of New York County, in replying to this same question, said that the pleuritic friction sound is usually quite limited in area, and changes its position frequently; it can be felt as well as heard.

Dr. Charles A. Leale of New York County, answered the third question by relating the histories of one or two cases in his practice, in which, notwithstanding the severity of the attack of empyema, Nature had succeeded in effecting a cure without operative interference. Incidentally, also, he gave an illustration of the contagiousness of pulmonary tuberculosis.

Dr. Thomas H. Manley of New York County, thought the dangers of aspiration were not generally appreciated. He stated that a review of his cases of thoracentesis showed that not one of them had lived after the operation more than three years.

Dr. Cronyn said he had been in the habit of using the aspirator quite early in all cases of pleurisy with effusion, and he had found this treatment only beneficial. He would treat acute pleurisy by revulsives, such as dry or wet cups, at the beginning, followed by a cathartic, and afterwards by opium to relieve the pain. Opium was preferable for this purpose to any of its alkaloids. He did not favor rib resection in empyema; it was unnecessary. He also called attention to the fact that consumption might be cured by metastasis, and cited a case under his observation, in which an attack of acute mania cured a pulmonary tuberculosis.

Dr. Donald McLean of Detroit, was also opposed to the use of the aspirator in the treatment of pleurisy, for it is rare that it willl completely empty a cavity. He thought resection of the rib in empyema was extremely important, and in accordance with surgical principles.

Dr. Dandridge took the same position with reference to resection of the ribs, but he thought aspiration was of service in some cases, as it produced a negative pressure in the chest and so aided lung expansion.

Evening Session.

Dr. Austin Flint of New York County, presented a paper, entitled,

remarks on fermentative dyspepsia.

As he was firmly convinced that fermentation in the alimentary canal is due to microörganisms, he naturally resorted to the use of various anti-fermentatives, and among these remedies he had found the subgallate of bismuth the best. It is best given in capsules or tablet form, in doses of 5 grains, either before or after each meal.

Dr Cronyn thought that in those cases in which the author had found this new remedy so efficient, he would have found hydrochloric acid equally beneficial, for the condition calling for treatment is apparently one characterized by a deficiency of hydrochloric acid in the stomach.

Dr. Henry F. Risch of Kings County, thought it was of the first importance in treating these cases of fermentative dyspepsia to ascertain whether the fermentation was due to decomposition of hydrocarbons or of nitrogenized substances. If the product of the fermentation be carbonic acid gas, it is evident that the hydrocarbons are at fault, and this class of food stuffs should be eliminated from the diet. Similarly, if the odor of the patient's breath is foul, the nitrogenized substances should be withheld.

Dr. C. Leale alluded to the great benefit that he had observed during the past summer in the St. John's Guild Hospital, from lavage of the stomach and bowels in infants, and from the subsequent use of sterilized milk.

Dr. John A. Wyeth of New York County, then read a paper entitled,

bloodless amputation at the hip joint; report of cases operated on by the author's method.

This method was introduced by him to the profession in 1890, and since then he had been able to collect brief histories of thirty-nine amputations at the hip joint in which it had been employed. In thirty-five cases, it was done for disease, and in four, for very severe injuries. Of the thirty-five, five died, and all of the cases of injury proved fatal.

Morning Session—Second Day—Wednesday, October 11.

Dr. W. D. Granger of Westchester County, sent a paper on the

voluntary commitment of the insane to asylums.

He said that the modern notion is that asylums should really be hospitals, and the treatment should be individualized as far as practicable. Many insane would avail themselves of asylum care if they could be voluntarily committed, and while several States had enacted laws permitting this, the patient after his commitment was treated about the same as those who had been placed in the asylum against their will. The New York law now permits persons

who are able to understand what they are doing, to voluntarily commit themselves to family asylums, but not for any specified time.

DR. GUSTAVUS ELIOT of New Haven, Conn., read a paper on

THE TREATMENT OF ENTERIC FEVER,

in which he laid great stress on keeping every patient with typhoid fever, or any suspicious fever, in a condition of absolute rest, mental and physical, until thoroughly convalescent. He advocated giving at the outset from 7 to 10 grains of calomel on alternate days for four doses, and subsequently administering iodin or carbolic acid in very weak solution.

DR. GEORGE DOUGLAS of Chenango County, added still greater emphasis to the importance of absolute rest, as a life saving measure, and also favored the giving of two or three doses of calomel at the beginning of the illness. He did not approveof the free use of alcoholic stimulants.

DR. WILLIAM FINDER of Rensselaer County believed that food should be given sparingly during the early stages, and expressed his great faith in the efficacy of sulpho-carbolate of zinc, as an internal antiseptic and astringent.

DR. JOHN H. MARTIN of Otsego County, also indorsed the calomel treatment. He fed his patients all through the disease, but was decidedly opposed to the use of alcohol in typhoid fever.

DR. E. R. SQUIBB of Kings County, said that the favorable action of calomel in this disease was no doubt due to the fact that it is first converted into an albuminate, and is then slowly decomposed into the more energetic antiseptic, the corrosive chlorid of mercury.

AFTERNOON SESSION.

SIR JAMES A. GRANT of Ottawa, Canada, in an interesting paper (which will appear exclusively in the JOURNAL in full) on

RARE FORMS OF GOUT AND RHEUMATISM,

cited the case of a young girl who had all the usual symptoms of perityphlitis, until the sudden development of acute articular rheumatism in the joints of the upper extremities, when the abdominal symptoms immediately subsided.

DR. DONALD MCLEAN of Detroit, then presented some interesting

SURGICAL AND PATHOLOGICAL MEMORANDA.

Among other things he said that a large experience with ununited fractures had taught him that the chief cause of their non-union was excessive violence at the time of the fracture. He described his method of controlling hemorrhage in amputation at the hip joint by means of an aortic compressor. He considers this method superior even to Wyeth's method.

DISCUSSION ON THE TREATMENT OF APPENDICITIS.

DR. FREDERIC S. DENNIS of New York County, opened the discussion, propounding the following questions:

Question 1.—What proportion of cases of appendicitis end in resolution?

Question 2.—What class of cases require immediate operation?

Question 3.—What class of cases do not require immediate operation?

DR. DENNIS said it was now generally accepted that about 50 per cent. of cases of inflammation in the ileo-cecal region end in resolution, and he did not approve of resorting to operation ordinarily until there had been a rapid pulse, a suppurative temperature, and intense pain for forty-eight hours without improvement. The operation is not easy or without risk, and it is very frequently followed by ventral hernia.

DR. GOULEY took the same position. He related the histories of several cases which had recovered without operation, although at first apparently seriously ill. Of course, where there is good evidence that perforation has taken place, immediate operation may save the patient.

DR. MCLEAN said the subject was weighed down with difficulties and responsibilities. He could recall quite a large number of cases during the past two years where, despite the urgency of the symptoms, and the fact that no operation was performed, recovery was complete.

DR. JOSEPH D. BRYANT of New York County, said that the relative frequency of foreign bodies in the appendix, in the two sexes, is about the same as the relative frequency of appendicitis in males and females, hence there is probably a close connection between the two facts, and this is interesting from an etiological standpoint. The symptoms of perforation are usually quite marked, and, when present, indicate the necessity of immediate operative interference. The presence of the "McBurney point" can only be considered as confirmatory of other signs, for the frequent and marked variations in the position of the caput coli show that no fixed point of tenderness can be looked upon as pathognomonic of appendicitis. The existence of a tumor is also of but little assistance, for in about 14 per cent. of cases the vermiform appendix is situated in the pelvis, and in 20 per cent. it is behind the caput coli. He would lay more stress upon rigidity of the rectus muscle than he would upon an elevation of temperature as a guide to diagnosis and prognosis.

DR. WYETH said that all the disasters he had seen in this branch of surgery had been due to delay, and not to too early operative interference. Again, the danger of ventral hernia is much less after an early operation.

MORNING SESSION—THIRD DAY—THURSDAY, OCTOBER 12.

DR. DOUGLAS AYRES of Montgomery County, read a paper entitled,

THE MALE CATHETER, WITH SOME OBSERVATIONS UPON THE PROPER MODE OF INTRODUCTION INTO THE BLADDER.

He said that the proper and scientific use of the catheter demanded a practical application of the familiar anatomical knowledge as to the three great divisions of the urethra—the prostatic, the membranous, and the spongy portions. While flexible catheters are often of service in cases where the urethra is unusually tortuous, the silver catheter, No. 9 or 10 of the "American" scale, was his main reliance, as he could more readily assure himself of the exact position of the instrument. The patient should be placed in the recumbent posture, with the thighs well drawn up and flexed, and the shoulders slightly elevated. It is well worth remembering that the introduction of the catheter in difficult cases is often greatly assisted by pressing down the soft parts above the pubes, thus relaxing the suspensory ligament.

DR. GOULEY then exhibited an instrument of unusual historical interest—an exact bronze model of the catheter found in the ruins of Pompeii. It has the sigmoid form, supposed to belong to a much later period; it is distinctly conical, and has one eye, situated close to the vesical extremity. He also exhibited a number of catheters of American manufacture, and stated it as his opinion that they excelled in finish those of all other manufacturers. Even the cheap 10-cent catheter is made with an excellent finish. He suggested that obstetricians should use these in their practice, for owing to their cheapness they can be thrown away after one using.

DR. WILLIAM FINDER of Rensselaer County, read a paper on

THE EFFICIENCY OF VACCINIA AFTER TYPHOID FEVER.

Some years ago he found that persons who had recently had typhoid fever could be vaccinated with the greatest ease, and that they appeared to be no longer immune to smallpox. He had had an opportunity to observe this curious fact on various occasions, and he now made it a practice to re-vaccinate people who had had typhoid fever since their last vaccination. He presented these observations in the hope that other observers would either confirm or disprove the theory he presented, that typhoid fever eliminated the protection produced by vaccination.

DR. H. ERNST SCHMID in a paper entitled

REFLECTIONS ON THE NEED OF CLOSE OBSERVATION OF DISEASE, AND UPON THE VALUE OF HYGIENIC THERAPEUTICS,

narrated some amusing anecdotes showing what wonderful results could be achieved, especially in the practice of medicine, by attention to details. Commenting on the uncertainties of medical science and art, he asked what justice there was in a law which punished physicians for making pardonable mistakes, and yet allowed the lawyer who loses his cases through like errors to go unpunished.

DR. DARWIN COLVIN of Wayne County, reported a case of puerperal blindness, in which a liberal venesection shortly before confinement greatly relieved the patient and, in his opinion, prevented the occurrence of eclampsia, and perhaps other severe complications.

DR. MCGILLICUDDY said he had seen five cases of blindness occurring in connection with puerperal eclampsia, yet all recovered their vision without a resort to venesection; and in a paper entitled,

A PLEA FOR THE NON-OPERATIVE METHOD OF TREATING DYSMENORRHEA, PELVIC INFLAMMATION AND PELVIC ABSCESS,

stated that he had found that the liberal use of hot water,

by mouth and by enemata, increased the portal circulation, and so promoted the absorption of pelvic exudates. Even when an operation becomes imperative, this treatment has put the system in a most favorable condition for operation.

Dr. Thomas D. Strong of Chautauqua County, was elected President for the ensuing year.

Cedar Valley Medical Society.—The following were elected officers for the ensuing year: President, N. S. Pierce, Cedar Falls; Vice-President, M. J. A. Mueller, Dyersville; Secretary and Treasurer, W. B. Small, Waterloo. Independence was selected as the place for holding the annual meeting next year.

NECROLOGY.

Dr. G. R. Shaw at Antigo, Wis., October 12.

Dr. J. W. Green of Marengo, Ill., October 14.

Dr. W. A. Martin at Goshen, Ind., October 19.

Dr. Allan A. Stevens at Sinclairville, N. Y., October 13.

Dr. W. H. Thompson of New Haven, Conn., October 18.

Dr. J. W. Weatherford, Portland, Oregon, September 20.

Dr. Justus Duffan of Houston, at Austin, Texas, October 9.

Wm. F. Hutchinson.—Dr. Wm. F. Hutchinson died at Providence, R. I., October 17. Dr. Hutchinson lived in Minneapolis, 1870 to 1873, when he removed to Providence. He was Assistant Secretary General of the Pan-American Medical Congress; and Vice-President of the American Electro-Therapeutic Association.

Dr. Moncrieff Drowned in Siberia.—Word has been received here of the death of Dr. D. Scott Moncrieff, who was sent to Siberia under the auspices of one of the auxiliary congresses of the World's Fair. The information came through Minister Dunn, at Tokio, Japan, who says Dr. Moncrieff was accidentally drowned. The State Department at Washington has also been notified.—*Chicago Post.*

Dr. Algernon Sidney Coe of Oswego, N. Y., died October 18. He was a surgeon of more than local prominence in the northern part of his State. During the late war he served as surgeon of the 148th Regiment from August, 1862 to June, 1865, and did not lose a day in all those three years. He was an alumnus of the College of Physicians and Surgeons, N. Y., of the class of 1854.

Dr. John N. Garnett, aged 73, died at Kansas City, October 14. Dr. Garnett was born in Virginia. He had been in Kansas City since 1879 and until of recent years had practiced medicine. In his younger days he was a great sportsman and was known as an expert with the gun and rod. Dr. Garnett is the father of ten children, five of whom, three sons and two daughters, are still living. His wife also survives him.

Dr. J. S. H. Fogg died October 16 at his home in South Boston. John Samuel Hill Fogg was born in Eliot, Me., May, 1826 He began the study of medicine with Dr. Theodore Jewett in 1844, attending meanwhile the medical course of lectures at the Bowdoin Medical School, and later at the Harvard Medical School, at which place he took his degree in 1850. He at once opened an office in South Boston, where he remained until his death.

In 1850 he married Sarah Frances Gordon, daughter of John Gordon, Esq., of Exeter, N. H., who died in 1871. A year later he married Miss Mary G. Clinch.

Dr. Fogg was a member of the Medical Society of Massachusetts, also a corresponding member of the Maine Historical Society. He was in the Massachusetts House of Representatives in 1855, and was for some years on the School Board of the city. He was a member of the Congregational Church.

Dr. John C. Peters Passes Away.—Dr. John C. Peters, the well-known authority on cholera, germ diseases and climatology, died on October 21 at his residence, "the Corners," at East Williston, L. I. He was 74 years old, and was stricken with palsy a short time before his death. Dr. Peters had practiced medicine in New York since 1842. He was born in that city, and educated at the College of Physicians and Surgeons and the medical universities of Berlin and Vienna. He was one of the founders and at one time president of the New York Pathological Society, and for many years was editor of the Society's proceedings. He was the physician and personal friend of Washington Irving. Dr. Peters made a special study of Asiatic cholera and his library on cholera is said to be the most complete in the country. He wrote many pamphlets on this subject. He assisted Dr. Edmund C. Wendt in preparing a treatise on cholera, and in 1866 wrote Peters' "Notes on Asiatic Cholera," a standard work. Dr. Peters suggested new remedies in the treatment of consumption, Bright's disease and membranous croup.

BOOK NOTICES.

The Southern Surgical and Gynecological Association Transactions. Vol. V. 1893.

This volume of this handsome series contains an account of the proceedings and the papers read at the fifth session of the Association, held at Louisville, Ky., Nov. 16, 17 and 18, 1892, under the presidency of Dr. J. McFadden Gaston of Atlanta. The papers in the volume include articles by Drs. Gaston, Brokaw, Haggard, Baxter, Dugan, McMurtry, Horace Grant, Ap Morgan Vance, Wm. W. Potter, R. M. Cunningham, Howard A. Kelley, Cartledge, Myers, Lydston, Taber Johnson, Bedford Brown, Jas. Evans, Coe, Simons, Chapman, Stone, our omnipresent friend H. O. Marcy, and others. One of the most interesting papers is by Bedford Brown, "Personal Recollections of the late Benjamin W. Dudley of Lexington, Ky.; and of his Surgical Methods and Work." Dr. Brown was a pupil of Dr. Dudley from 1846 until the conclusion of his medical education, and was therefore in a position to know the great pioneer surgeon thoroughly. If it be true that "no man is a hero to his valet," it is equally true that the old-time preceptor was sure to be *the* great man of his age to his pupil. The following announcement will strike many as a revelation: "In the use of sterilized water as a dressing for wounds he had an abiding faith, and used it to the exclusion of all other dressings. Not a drop of non-sterilized water was permitted to touch a wound. He believed that unboiled well or spring water contained poisonous materials, the nature of which of course was not well defined in his mind. He contended that the purest form of water, next to boiled or distilled water, was that from the cistern, which was used exclusively for drinking purposes in his family and office. His use of boiled water in all wounds, except those healing by first intention, was profuse and abundant." Our space is not sufficient to quote further from this most interesting paper, and we rise from its perusal with greater admiration for the surgical methods of fifty years ago, and regret that there were not more Dudleys in that period, now growing misty with the lapse of time. Of the other papers in the volume it is only necessary to say that they are replete with scientific interest. The general appearance of the volume is highly creditable to the accomplished Secretary, Dr. W. E. B. Davis of Birmingham, Ala.

A Text-book of Ophthalmology. By WILLIAM F. NORRIS, M.D., Professor of Ophthalmology in the University of Pennsylvania, and CHARLES A. OLIVER, M.D., Surgeon to Wills Eye Hospital, Philadelphia. In one octavo volume of 641 pages, with 357 engravings and 5 colored plates. Cloth, $5.00; leather, $6.00. Philadelphia: Lea Brothers & Co. 1893.

This work is divided into two parts, of which the first is by Dr. Oliver and treats of embryology, macroscopic and microscopic anatomy, physiology, optics, physiological optics, examination of the eye, ophthalmoscopy, fundus-reflex test, methods of determination of errors of refraction and accommodation, and correction of errors of refraction and accommodation.

The painstaking care with which the author has developed every detail of his subject, has produced a work which leaves little to be desired; there is no padding or redundancy, and there is an earnestness born of an intimate knowledge of the subject and a sincere desire to convey instruction.

The second part of the work, by Dr. Norris, treats of the diseases and injuries of the eye, the eyelids and the orbit, including the affections of the optic nerve and its internal prolongations. The concluding chapter describes some of the more common and important operations on the eye. In this section the same care has been taken to prune superfluities, and secure precision, as in the first, but naturally the author has more latitude of expression, owing to the nature of his subject.

The illustrations are excellent and the typography good.

Anatomy, Descriptive and Surgical. By HENRY GRAY, F. R. S., Lecturer on Anatomy at St. George's Hospital, London, New American from the thirteenth enlarged and improved English edition. Edited by T. PICKERING PICK, F. R. C. S., Examiner in Anatomy, Royal College of Surgeons of Eng and. In one imperial octavo volume of 1,100 pages, with 635 large engravings. Price with illustrations in colors: Cloth, $7.00; leather, $8.00. Price with illustrations in black: Cloth, $6.00; leather, $7.00. Philadelphia: Lea Brothers & Co. 1893.

This well-known work on anatomy which has been the principal text-book in England and the United States for the last thirty-five years, has again made its appearance in a new edition, this time wholly English. The Holden's Landmarks incorporated in the last edition have been omitted. The changes have included the latest teachings on general anatomy and the development of the tissues. No recommendation of ours could add to the already high estimation in which this book is held by the profession in America. It has sometimes been said that there were many errors in Gray, but nevertheless they have grown fewer with each successive edition, and it takes such a hypercritical vision to discover them now, that like the spots on the sun, the average man only knows of them from hearsay.

A Hand-book of Ophthalmic Science and Practice. By HENRY E. JULER, F.R.C.S., Ophthalmic Surgeon to St. Mary's Hospital; Surgeon to the Royal Westminster Ophthalmic Hospital, London. New (second) edition, revised and enlarged. In one octavo volume of 562 pages, with 201 engravings, 17 colored plates, test types and color blindness test. Cloth, $5.50; leather, $6.50. Philadelphia: Lea Brothers & Co. 1893.

This well-known work contains concise descriptions and typical illustrations of the important affections of the eye. The different structures are treated of seriatim, commencing with the eyelid, and concluding with a chapter on diseases of the orbit. The most extensive chapter in the book is that devoted to normal refraction and errors of refraction. The consideration of the diseases of each structure commences with the anatomy and physiology of the part. The illustrations are much better than are usually found in manuals of this character, and the colored plates are fine specimens of the chromo-lithographic art. In the appendix will be found useful formulæ, reading tests and test types.

Essentials of Bacteriology. Being a Concise and Systematic introduction to the study of microörganisms for the use of Students and Practitioners. By M. V. BALL, M.D. Physician to the Eastern State Penitentiary at Philadelphia. Second edition, with eighty-one illustrations, cl. 16 mo. pp. 205, Philadelphia: W B. Saunders. 1893.

This little book having passed to its second edition, has its success assured in advance. Bacteriology has made such rapid changes in the last year that a work on the subject needs frequent revision to keep in touch with the new discoveries. The author says: "In this second edition the results of last year's earnest work have been embodied.... The separation from the blood of antitoxines, and their application to the cure of disease will probably revolutionize our present method of treatment, and add some peculiar agents to our materia medica. The question of immunity is still unanswered, though the phagocytic theory of Metschnikoff and the Alexines of Buchner are bringing us to the solution. Upon these lines the greatest efforts are at present being made."

Johns Hopkins University, Baltimore. Studies from the Biological Laboratory. Vol. V. No. 4. Baltimore. 1893. Price $1.00.

The contents of this volume are, 1, An undescribed Acranate by E. A. Andrews; 2, Contributions to the Embryology of Chiton, by Maynard M. Metcalf; 3, The formation of the so-called Cypress-knees on the Roots of the Taxodium Distichum, by John P. Lotsy; 4, On the Origin and Development of the Stichidia and Tetrasporangia in Dasya Elegans, by B. W. Barton. This volume is edited by Prof. H. N. Martin and Prof. William K. Brooks.

Asiatic Cholera: Its genesis, etiological factors, clinical history, pathology and treatment. By JOHN A. BENSON, Professor of Physiology and Associate Chief of the Department of Medicine, College of Physicians and Surgeons, Chicago. Chicago: The J. Harrison & White Co. 1893.

This is a book of 248 16mo. pages, in which the author has compiled in a series of lectures to his class, the essentials of the current teaching in regard to cholera. It is well written and has been brought up to date. The illustrations are cheap and poorly done, but as a whole the book is to be highly commended.

Minor Surgery and Bandaging. By HENRY R. WHARTON, M.D., Demonstrator of Surgery in the University of Pennsylvania. In one 12mo. volume of 529 pages, with 416 engravings, many being photographic. Cloth, $3.00. Philadelphia: Lea Bros. & Co. 1893. Second Edition.

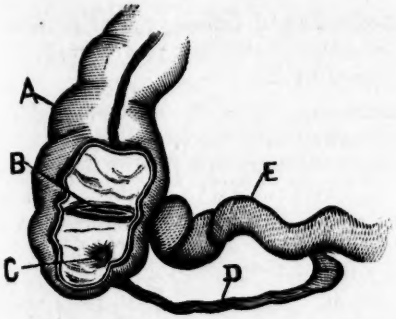
There is little change in this work from the original edition published in 1891. The author says: "The aseptic and antiseptic methods of wound treatment have been thoroughly revised, and a considerable number of new illustrations have been added."

SELECTIONS.

Abnormal Appendix Vermiformis.—So much surgical work is being done to-day upon this part of the intestine that the following anomaly is worthy of notice: the subject, a native of Germany, had died at the age of 63, of phthisis. In dissecting the region of the cecum, I found the appendix beginning by a funnel-shaped opening at its lower and posterior portion; thence running over the brim of the pelvis, and terminating in a cul-de-sac, which opened into the ileum about three and one-half inches from the ileo-cecal valve.

Its appearance was smooth and bluish pink, about the size of a lead pencil, and measured six and one-half inches in length. It readily admitted a good sized probe at its termination in the ileum which passed into the cecum,

There was no evidence of previous inflammation, and its mucous membrane seemed to be continuous with that of the ileum.



A—Colon. B—Ileo-cecal valve. C—Orifice of appendix. D—Appendix. E—Ileum.

The specimen (which the accompanying engraving shows about one-fourth the natural size) may be seen in the museum at Cooper Medical College.—Lawrence Boido, S. B., in *Occidental Medical Times.*

Hard Times and Free Medicine.—From every part of this great and rich country, the news comes to us of extreme stringency in the financial position of our confrerés, the general practitioners. Never was there a richer opportunity for the masses to play the pauper than now. The present panicky state of the money-market affords people an immense excuse for wholesale imposition on the profession. The conditions of the times will not give them free bread, free clothes, free transportation on the railroads or rent free, but they hie away to many of our too numerous hospitals and dispensaries for free treatment—advice, medicine and all included for nothing, or for "ten cents"—the figure fixed in certain palatial infirmaries.

The consequence of all this has been most demoralizing to the profession and the public. Practitioners reduced to a state of enforced idleness and grim want, are forced either to quit their profession altogether, or to "mee *steal* with steel," to open rival dispensaries, to advertise, or to drift into downright quackery.

Many cases have come to our knowledge which go to prove that the practice in vogue in many of our largest dispensaries is a species of downright robbery, and tends to work incalculable harm to the profession. Case after case is taken from among people of ample means and turned over to the hospital or to the college professor for his clinic, without a word being asked as to their mendicity or ability to pay anything at all. Cheap railroad excursion rates drain the outlying villages for miles in every direction.

This hydra-headed monster of indiscriminate free treatment must be seized and strangled, or we will soon see the profession of medicine dragged in the dust; open downright quackery will be rampant, and integrity and honor in the healing art will be things of the past.

By no means let us withhold our services to the poor and deserving, for humanity compels us to gratuitously attend those without means. Nor let us strip the field of such clinical material as legitimately belongs to the teacher, but let the teacher not forget that he has no prescriptive right to filch from the struggling practitioner what justly belongs to *him.—Medical and Surgical Reporter*, Oct. 21, 1893.

Relative Values of Meat Extracts.—In the *Public Health* for September, 1893, we find the results of an official analysis of several extracts of meat, made by Mr. Tatlock, the public analyst for the city of Glasgow. These studies form a part of the annual report of the Chief Sanitary Inspector, Mr. Fyfe. The desiderata now aimed at in the preparation of these food-stuffs are, 1, a concentration or freedom from water, as great as possible; 2, freedom from fat; 3, palatability. It is an error, held by very many that a given weight of meat-extract may contain many times the nourishment of the same weight of meat. This can not be, since no extract can possibly hold more than the total soluble parts of the beef, which are not more than one-fifteenth part of the weight of beef itself. The table given below contains a comparison regarding four specifically named extracts; and the analyst introduces his table with the following remarks:

"In making a comparison of the relative values of these samples, it is only necessary to determine how far they comply with the above requirements. Bovril does this within 20 per cent., but it is but fair that allowance should be made to this extent for water necessarily present to keep the extract in a soft state. Liebig's also complies with these conditions, and even more closely, as this extract shows little over 10 per cent. of water, but it is an extra dry one. Valentine's, containing as it does over 50 per cent. of water, does not fulfill these conditions, so that after allowing for 20 per cent. water, it might well be 30 per cent. stronger. Brand's extract is scarcely an extract at all in anything else than the name, as is obvious from the fact that it contains over 90 per cent. of water, so that after allowing for 20 per cent. water it might contain 70 per cent. more dry extract of beef."

	Per Cent.			
	Bovril Fluid Beef.	Liebig Co.'s Extract of Meat.	Valentine's Meat Juice.	Brand Co.'s Essence of Beef.
Water	20.42	10.79	51.40	90.48
Ether Extract	0.56	0.08	0.04	Trace
Albumen, Peptones and Gelatines	14.67	17.60	7.66	4.83
Crestine and Nitrogenous Extractives	37.01	42.20	18.56	2.98
Non-Nitrogenous Extractives	8.00	8.59	11.96	0.47
Mineral Matter	19.34	20.74	10.38	1.24
	100.0	100.0	100.0	100.0
Total Solids	79.58	89.21	48.60	9.52
Weight of Sample	2 ozs.	2 ozs.	2⅓ ozs.	2¾ ozs.
Ounces of Meat from which the total sample is Derived	24.6	27.6	17.5	4.1
Pounds of Lean Roast Beef required to make 1 lb. of Extract	12.3	13.8	7.5	1.5

MISCELLANY.

New Medical College.—The trustees of the Kansas Medical College met at Topeka, October 9, and voted to erect a new college building. Francis Storrs, M.D., was elected Instructor in Latin and G. L. Beers, A.M., M.D., Professor of Materia Medica and Therapeutics.

Sir Andrew Clark.—This well-known London physician was stricken with paralysis while talking with a patient, October 19. He was born Oct. 28, 1826, and was graduated in Edinburgh. The attack, in view of Sir Andrew's great age, is considered serious.

New York Post-Graduate Hospital.—In the Court of Common Pleas, Judge Bischoff denied an injunction *pendente lite* applied for, to stop the erection of the new structure at the corner of Second Avenue and Twentieth Street. The Court held that as the old structure had been occupied for many years for hospital purposes, without becoming a nuisance, the new building should be permitted to proceed.

New Pasteur Institute at New York.—On October 9 a handsome new structure was formally dedicated to this institution. The building is of stone and brick, five stories high, and contains every appliance indicated by modern ingenuity for the relief of hydrophobic sufferers. It is located at West Central Park and Ninety seventh Street. It will

remain under the control of Dr. Paul Gibier, formerly the Assistant Professor of Pathology at the Paris Museum, and since 1889 a resident of New York city. The address on this occasion was delivered by Dr. Ogden Doremus, who pointed out the necessity of supporting complete laboratories and infirmaries for those unfortunates who seek the Pasteurian treatment, and on account of diseases of the nervous system. The private means of Dr. Gibier, together with a few contributions from sections where the good results of the treatment have been gratefully recognized, are the sole source of present support. Neither city nor national legislators have felt impelled to give any vote of assistance to this beneficent undertaking.

Hospital Change.—The patients were removed from the old City Hospital to the new hospital at St. Paul, October 16.

New Hospital at Lincoln, Neb.—The Cottner Medical College has established a hospital in connection with their institution.

Hospital for the Insane, Middleton, Conn.—This institution is to have an annex at a cost of $100,000, that amount having been appropriated by the last Legislature.

New Hospital at Champaign, Ill.—A new hospital is to be established at Champaign, Ill. A banker of that city starts the subscription with a check for $10,000.

Proposed New Hospital, Chillicothe.—The physicians of Chillicothe, Ohio, E. F. Waddle, J. M. Leslie and others have urged upon the city authorities the establishment of an Emergency Hospital at Chillicothe.

Foundling Hospital Closed.—The San Francisco authorities have closed the Foundling Hospital on account of alleged mismanagement. The infants still alive in the institution were handed over to the Sisters of the Good Shepherd.

New Hospital at San Francisco.—The new hospital annex of the Cooper Medical College of San Francisco will be opened some time next summer. The building will cost somewhere in the neighborhood of $150,000 and will have a capacity of 100 beds.

Landgraf Home and Hospital.—Articles were filed in the County Clerk's office October 18, establishing the Alma Landgraf Home and Hospital of New York city. The trusttees are Alma and John Landgraf, Runegrunde Sulzer, Mary Mecker, Emma and George Schmidt and Charles, Matilda and John Morgan.

The Board of Managers of the Chester, Pa., Hospital met October 10, and in addition to reëlecting the old officers of the Board, appointed the following medical staff for the ensuing year: Drs. J. L. Forwood, J. T. M. Cardeza, W. B. Ulrich, F. F. Long, S. R. Crothers, F. R. Graham, Ellen Brown, Hannah J. Price, D. W. Jefferis, J. M. B. Ward. Drs. Cardeza and Ward are new members of the staff, and take the place of Drs. J. Frank Evans and C. W. DeLannoy.

Choked by a Sponge.—A patient at St. Joseph's Hospital, Syracuse, N. Y., while undergoing an amputation October 17, the throat filled with mucus and an attempt was made to clear the fauces by sponging. The sponge slipped from the forceps and was drawn into the trachea by inspiration. Tracheotomy was immediately performed and the sponge extracted, but the patient was fatally asphyxiated and did not rally.

New Laboratory.—The bacteriological laboratory of the Postgraduate Medical Department of the University of California is now fully equipped and ready for students. It is under the direction of Dr. John C. Spencer, and is one of the most complete of its kind in the West.

Dr. S. O. L. Porter, for the past eight years Professor of Practice at the Cooper Medical College, has resigned his chair.

The Charleston Medical College opened October 16 with an increased attendance over last year. Dr. F. L. Parker gave the opening lecture.

Appointments.—Drs. Wm. P. Northrop, S. T. Armstrong and Albert I. Swan have been appointed visiting physicians to the Contagious Disease Hospital on North Brother Island, N. Y.

The Schoolmaster Abroad.—The Medical Practice Act of Connecticut, took effect October 1, and applicants for registration are numerous. The following are reported as among the applications recently received, from which it would appear that the Examining Board has not commenced its labors too soon:

"I taught first when I received your notice that your board did not register vetenary surgean, but I lernt cence that you do I practic foure years under other Doctors and Three years alone before I came to this state I have been Two years in this state I did not state that I had practiced in this state on the blank because I did not have an office hear altho I have practice I have had at anavrag one case a week cence I have been hear."

Another produced the following:

"I write to you to see if I can get a permit to put up a Blood medison maid of Herbs this has been my business for years and I intended to have wrote to you befour this but I have had a sick Lady to see to so I have not had time."

Both of these epistles were received from residents of the same town.

Alvarenga Prize of the College of Physicians of Philadelphia.—The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about one hundred and eighty dollars, will be made on July 14, 1894, provided that an essay deemed by the Committee of Award to be worthy of the prize shall have been offered.

Essays intended for competition may be upon any subject in medicine, but can not have been published, and must be received by the secretary of the College on or before May 1, 1894.

Each essay must be sent without signature, but must be plainly marked with a motto and be accompanied by a sealed envelope having on its outside the motto of the paper and within it the name and address of the author.

It is a condition of competition that the successful essay or a copy of it shall remain in possession of the College; other essays will be returned upon application within three months after the award. CHARLES W. DULLES, Sec'y.

Sanitation Mass Meeting.—A sanitation mass meeting was held in San Francisco on the 3d inst. to consider leading questions of sanitary reform. The attendance was a large and enthusiastic one, and the meeting was addressed by leading physicians and citizens. Dr. Winslow Anderson, a member of the State Board of Health, read an able paper on "Filth Diseases: Cholera, Diphtheria and Typhoid Fever." He referred to the thoroughly organized defensive campaign of the Board of Health against any possible invasion of cholera. "Inspectors," he said, "are ready at an hour's notice to go to any point of ingress on our borders; there strict quarantine will be observed; every case will be isolated, disinfected, guarded. We have the hearty coöperation of our chief executive, of all the railroads, and ample funds at our command should the emergency arise." Dr. Anderson warned his listeners against over confidence in the peculiar situation and favorable atmospheric conditions of San Francisco, citing the great epidemics in Sweden and Russia as evidence that immunity from cholera is not dependent upon conditions of climate. His advocacy of a new sewerage system for the city was enthusiastically received. Matters of such grave moment to the people should not be left, he said, to supervisors and political jobbery; but to a board of men skilled and experienced in sanitary science.

Choking to Death.—A policy of accident insurance covered only injury or death received through external, violent and accidental means. The insured lost his life by eating a piece of beefsteak that, in the attempt to swallow, accidentally passed into his windpipe, choking him to death in a few moments. That the policy covered such death was of course denied by the insurance company. But the Court of Appeals of Kentucky, in a decision rendered Sept. 16, 1893, (Amer. Acc. Co. v. Reigart, 23 S. W. Rep. 191) holds otherwise. It says that it was only required that the means or that which caused the injury should be external, and not that the injury should have been external, and that when the substance causing the death was visible, and placed in the mouth of the assured, lodging by accident in the windpipe, instead of the stomach, producing injury or death, it was as much an accident as if he had taken arsenic under the belief that it was some harmless medicine, which the authorities hold renders an insurance company liable. While a violent death, as the term is used, is simply an unnatural one,—a death not occurring in the ordinary way.

Must have a License.—The Health authorities of Philadelphia have given notice that lying-in hospitals in that city must hereafter comply strictly with the law, and such institutions must take out a license.

The law passed by the Legislature and approved by the Governor was prepared by the Pennsylvania Society for the Protection of Children from Cruelty. Its expressed purpose is to keep lying-in houses within sight and prevent malpractice and criminal operations at so-called maternity hospitals. Major Veale, Chief Medical Inspector Taylor and Secretary Crew, of the Children's Society, are determined to have the law's provisions carried into effect.

In order to secure a license application, in writing must be made to the Board of Health, to which the names of six reputable citizens must be appended testifying to the respectability of the applicant. The house named is then to be visited by Chief Medical Inspector Taylor, who reports to Health Officer Veale, after which the Board of Health takes action. The license is for two years, for which a fee of $5 is charged.

Licensed institutions are furnished with blanks on which all cases looked after are to be reported to the Health Office, showing the name and residence of the mother, the date of birth of the child and the time and place of removal of the child.

Public Health in Minnesota.—The mortality record for August, 1893 (see page 72), 1,021 deaths, is noteworthy as larger than the average of the same month for the last six years (1,016.8) and greater than the record of this month in any of those years except 1888 (1,415).

Looking for the cause—*Tuberculosis*—was much in excess of the average (109—92.5) and greater than the same month in any year except 1890 (115). *Enteric Fever* greater than the average of six years (48—30.5) or the same month of any year since 1887. *Diphtheria* was in excess of average of six years (30—31) and only exceeded by the record of 1888 and 1890 (40—38). Other diseases of the list are notably less than the average, but *Diarrheal Diseases of Children* caused greater mortality than for the same month in last six years, except 1888 (260-379). *Pneumonia* was much below the average of six years. There has been a steady decline in the mortality from this cause in August, since 1887 (31, 18, 16, 14, 12, 11) and the same is true of *Bronchitis* (13, 12, 11, 11, 8, 5).

Enteric (Typhoid) Fever made the following mortality record in 1892 as compared with 1891 and the average of six years (1887—1892).

DEATHS PER 100,000 OF POPULATION.

	Average in six years. 1891	1892	Avg. of 6 yrs.
State at large	41.	30.9	42.32
Cities over 35,000	55.3	47.4	69.5
" 15,000 to 35,000	146.1	87.7	118.8
" 5,000 to 15,000	56.2	36.8	41.1
Cities and Villages under 5,000	29.4	21.8	29.8

In other words the mortality from enteric fever in 1892 was less in all classes of our population than in 1891, and than the average of six years. It is but just to give separately the rates of the two cities which make up the second class (Winona and Duluth).

DEATHS PER 100,000 OF POPULATION.

	1891	1892	Avg. of 6 yrs.
Duluth	214.3	123.82	172.1
Winona	21.9	21.9	20.14

Winona is located on a sandy gravel through which passes the cold and hard spring water from the high land to its rear, and the problem of disposing of excreta and garbage has been a comparatively easy one, as has the introduction of public water supply and sewer system. Besides it has had for years a well equipped and active Local Board of Health and under the direction of Dr. Franklin Staples as Health Officer.

Duluth on the contrary is literally founded on rock, so that the introduction of public water supply and construction of sewers has been a very expensive and tedious labor. The population in a limited area has increased with great rapidity and the city has, besides, to accommodate a large floating population going and coming from the mines and lumbering camps. Despite these natural difficulties and secondary causes of enteric fever, under the vigorous and intelligent direction of the present Health Officer, Dr. W. G. Goffe, the work of sanitary improvement has begun a marked and steady reduction of mortality from this cause, e. g., the annual mortality for 1892 was 123.82 per 100,000 of the population as compared with 214.3 in 1891.—*Public Health*, September, 1893.

THE PUBLIC SERVICES

Army Medical Examination Papers at the Recent Examinations.

ARITHMETIC.

1. When the divisor and quotient are given, how can you find the dividend?
2. How many inches are there in .0625 of a yard?
3. What is the interest on $865.32 for 1 year, 3 months, 10 days at 7 per cent?
4. If 1.5 pounds of sugar cost $0.023 what will 25 pounds cost?
5. How many grammes are there in 7 2-5 pounds avoirdupois?
6. Illustrate the six principal forms of triangles.

GEOGRAPHY.

1. Give the boundaries of Italy by land and sea.
2. Name the principal rivers of India.
3. Through what States would you pass, going from St. Louis to Mobile?
4. Bound Minnesota and name the capital.
5. Through what States does the Connecticut River flow.
6. Name the provinces of British America.
7. Name those parts of the United States where the rainfall is unusually large.
8. Give an outline of the indications useful in weather predictions in the Eastern United States.

HISTORY AND LITERATURE.

1. From what power was Louisiana purchased and in what year?
2. State what you know of the battle of Palo Alto.
3. Who composed the first Roman triumvirate?
4. When and with whom did the Plantagenet line of English sovereigns begin and end?
5. What historian has the United States produced? Name at least one work of each.
6. In what works do the following characters appear: Ichabod Crane, Uriah Heep, Colonel Newcombe, Falstaff?
7. Who was Poe? When did he live and what did he write?
8. Mention the principal authors contemporary with Queen Elizabeth.

PHYSICS.

1. What is the mechanical principle of the pulley? What advantage is gained by use of a single pulley? What by a series of pulleys?
2. What is meant by the pressure of the atmosphere? Under what conditions does it vary?
3. What is an artesian well? What principle of hydraulics does it illustrate?
4. What fundamental laws of light are illustrated in the action of lenses?
5. What are the peculiar features of an insular climate and how are they explained?

6. Briefly explain the principle of the electric telegraph.

CHEMISTRY AND TOXICOLOGY.

1. What is meant by catalytic action? Give an example of this action.
2. What is the atomic weight of sulfur? From what place is the sulfur of commerce chiefly derived? What is the symbol of the gas which it forms by its union with hydrogen gas? How is this gas prepared?
3. What is bleaching powder? What is its chemical symbol? How is it prepared?
4. Describe the chemical action which takes place when fragments of iron wire are dropped into hydrochloric acid. When they are dropped into sulfuric acid. When they are dropped into nitric acid.
5. What conditions are necessary to the process of alcohol fermentation? Describe the process. What are its products?
6. Describe briefly, Reinsh's test for arsenic.

MATERIA MEDICA AND THERAPEUTICS.

1. Give a brief account of the physiological action of atropin, and mention the diseases in which belladonna has been employed. Give officinal preparations with doses.
2. Contrast the physiological effects of the three most important anesthetics. How are they supposed to act, and what are their relative dangers?
3. Enumerate the salts of potash employed as medicines. Give dose and brief therapeutic indications for each of them.
4. Mention the remedies which produce vasomotor paralysis, as well as those which have the opposite effect.
5. Give physical characters, source, solubility, dose and brief therapeutic application of aconitin, amyl nitrite, acetanilid, antipyrin and aristol.

PHYSIOLOGY AND MEDICAL JURISPRUDENCE.

1. Draw a diagram of the lateral surface of the left cerebral hemisphere (human brain) marking out carefully the cortical areas.
2. Describe the minute structure of voluntary and smooth muscle, and state what physical and chemical changes take place in muscle during contraction.
3. Describe the part taken by the pancreatic juice in the digestive process.
4. Mention the important waste products of the body; give the quantity of each daily excreted, and state what organs are concerned in their elimination.
5. In conducting an examination of the dead body of a newborn child, what circumstances would lead you to the opinion that the child had been born alive? What does the term, "born alive," imply in a legal sense?

ANATOMY.

1. Describe the phrenic nerve, its origin, course and relations to other organs. How does the right nerve differ from the left?
2. Describe the origin, course, distribution and exact relations of the median nerve.
3. Describe the posterior tibial artery and its exact relations.
4. Describe the popliteus muscle and its exact relations.
5. Describe the ulna. Give its relations in the arm. Locate the areas of attachment of the muscles that arise from or are inserted into it.

SURGERY.

1. What is traumatic fever? How and under what circumstances does it occur and what causes it?
2. How do wounds heal? (Take this subject and write a brief account of what you know about it.)
3. What are the symptoms, etiology and treatment of phlegmonous erysipelas?
4. What are some of the latest views on the surgical management of aneurism?
5. Describe some of the principal amputations done upon the foot, with illustrative diagrams.

PATHOLOGY AND BACTERIOLOGY.

1. Describe the microscopic appearance of a tubercle; give its mode of formation and the subsequent changes which it may undergo.
2. What pathological changes would you expect to find in the lungs, liver, spleen and kidneys, in a case of long-standing obstructive lesion of the heart?
3. Give the histological characters of sarcoma.
4. Mention several of the most important discoveries made in bacteriology during the period, 1880–1893.
5. Describe the morphological and biological characters of streptococcus pyogenes. What diseases are caused by this organism?

HYGIENE.

1. What are the forces which occasion an upward movement of the air of a room or ward, through a ventilating shaft extending from the ceiling to beyond the ridge?
2. What kind of water or class of waters act most readily on lead pipes? What are the prominent symptoms caused by the continued use of water contaminated with lead? Could you discover whether lead was present in a given water? If so, describe the experiment by which you would discover its presence.
3. What is meant by the siphonage of a water trap? How is it prevented?
4. Why are starchy and saccharin articles of food such as arrowroot, tapioca, etc., used so largely in the diet of sick persons?
5. What diseases or diseased conditions are usually attributed to exposure to sewer air? What are the constituents of sewer air, and which of them are the active agents in the production of the diseases you have mentioned?

PRACTICE OF MEDICINE.

1. Give the clinical history and differential diagnosis of acute miliary tuberculosis.
2. State briefly the causes, diagnosis, symptoms and treatment of acute pericarditis.
3. What are the varieties and causes of jaundice?
4. What, briefly, are the causes, symptoms and treatment of acute nephritis?
5. What are the principal forms of insanity? What are the characteristic symptoms of, and what the prognosis in melancholia?
6. Describe the clinical course of a case of leprosy.

OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN.

1. Presentation and position and relative proportions of maternal and fetal parts being normal, what causes may delay labor? Indicate treatment of one.
2. Under what circumstances should version be performed? Briefly give method.
3. What are the symptoms of placenta previa? How would you treat a case?
4. What are the supposed causes, the symptoms and the treatment of chlorosis?
5. What affections are liable to demand attention at the menopause?
6. What abnormal conditions, besides suspended animation, may require treatment in a newly born infant? Selecting most common, how would you treat it?

Army Changes. Official list of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from October 14, 1893, to October 20, 1893.

First Lieut. A. N. STARK, Asst. Surgeon, now at Ft. Clark, Texas, will proceed at once to Ft. McIntosh, Texas, and report to the commanding officer, for temporary duty with troops in the field at Carrizo, Texas.

First Lieut. ROBERT S. WOODSON, Asst. Surgeon U. S. A., now temporarily at Ft. McPherson, Ga., will return to his proper station, Ft. Barrancas, Fla.

First Lieut. MERRITTE W. IRELAND, Asst. Surgeon (Ft. Apache, Ariz. Ter.), is granted leave of absence for one month, to take effect about the 20th inst.

LETTERS RECEIVED.

(A) Anderson, Winslow, San Francisco; Ashmun, G. C., Cleveland, O.; (B) Bates & Morse Adv. Agency, New York City; Blackwell, Emily, New York City; Ball, R. V., Philadelphia, Pa.; Barker, T. R., Philadelphia, Pa.; Brainard, Mrs. N. I., Osage, Iowa; (C) Clark. M. S., Youngstown, O.; Cantwell, A. W., Davenport, Iowa; (D) Dunglison, R. J., Philadelphia, Pa.; Daggett Table Co., Buffalo, N. Y.; (E) Eskridge, J. T., Denver, Col.; (F) Ferdinando, H. J., Calcutta, India; (G) Good Health Pub. Co., Battle Creek, Mich.; Grigsby, W. E., Blandinsville, Ill.; (H) Haldenstein, I., New York City; Hewitt, C. N., Red Wing, Minn.; Hummel & Parmele, Philadelphia, Pa.; Hill, E. W., Newton, Mass.; (J) Jones, A M., Eaton, O.; (K) Kahn, Jos., Milwaukee, Wis.; (L) Loeb, H. W., St. Louis, Mo.; Leffingwell, H. S., Milwaukee, Wis.; Levy, Robt., Denver, Col.; (M) Mettler, L. H., Chicago, Ill.; Minor, J. C., Hot Springs, Ark.; Marshall Printing Co., Marshalltown, Iowa; Morse, J. C., Buffalo, N. Y.; Medical Echo Pub. Co., Lynn, Mass.; McFarland, D. W.; Waterbury, Conn.; Morton, T. G., Philadelphia, Pa.; McLellan, E. A. Boston, Mass.; (O) Oelrichs & Co., New York City; Owsley, W. T., Washington, D. C.; (P) Peacock Chemical Co., St. Louis, Mo.; Parke, Davis & Co, Detroit, Mich.; (R) Raymond, J. H., Brooklyn, N. Y.; Robinson-Pettet & Co., Louisville, Ky.; Rowell, Geo. P. & Co., New York City; Ravenel, M. P., Charleston, S. C.; Reece, Madison, Abington, Ill.; (S) Smith, A. J., Univ. of Texas, Galveston; Stockslager, S. O., Boone, Iowa; Stearns, Frederick & Co., Detroit, Mich.; Smith, Mrs. B. H., Seattle, Washington; Smith, Prescott, Cincinnati, O.; Stemis & Eastman, Syracuse, N. Y.; Simms, J. R., Racine, Wis.; (T) Tracy E. A., S. Boston, Mass.; Taylor, H. L., St. Paul, Minn.; Taylor, J. M., Corinth, Miss.; Town, L. S., Geneva, Mich.; (U) University of Buffalo, Buffalo, N. Y.; (W) Wallace, J. S., Brunswick, Mo.; Wiltrout, J. D., Hudson, Wis.; White, J. A., Richmond, Va.; Westlake, W. B., Logansport, Ind.; (Y) Yates, W., Chicago, Ill.